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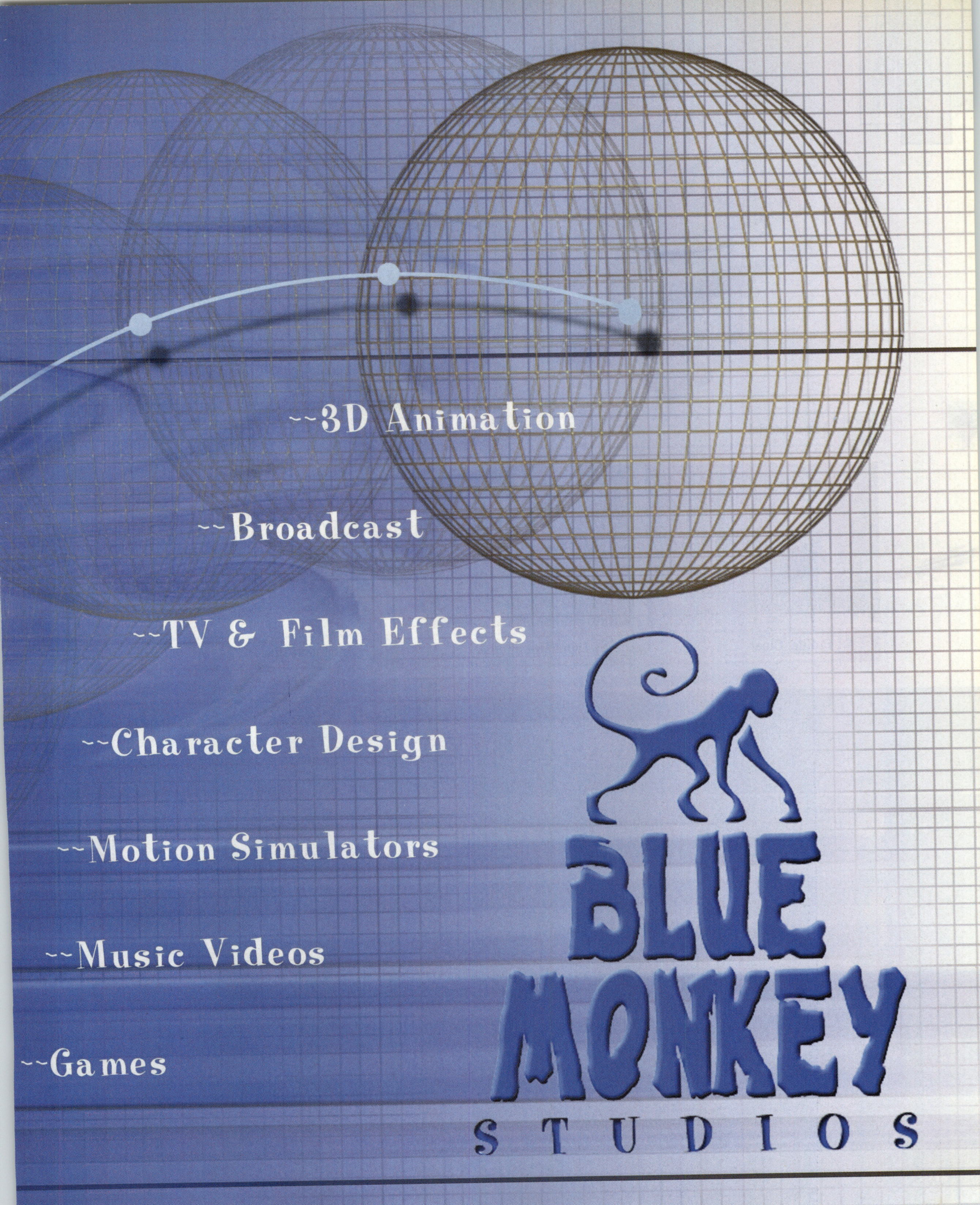
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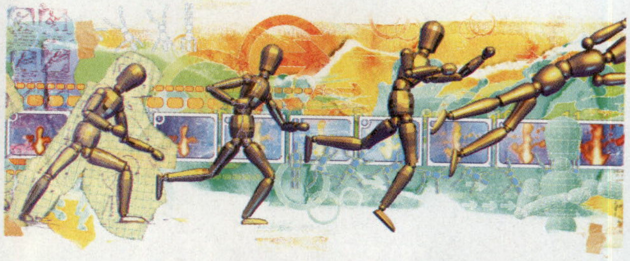

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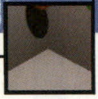
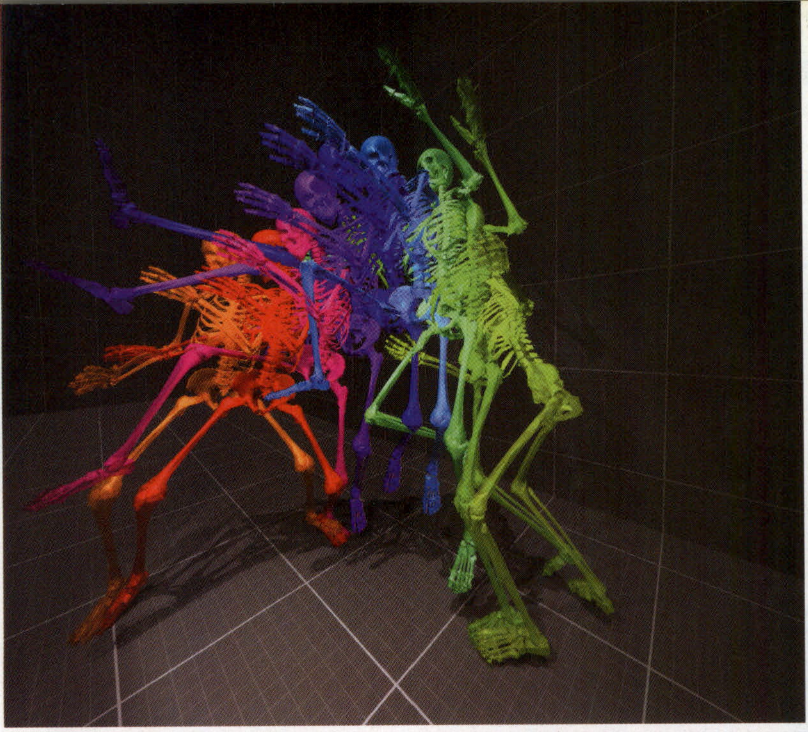


Flick-book animation by Matthew Harvey ➤



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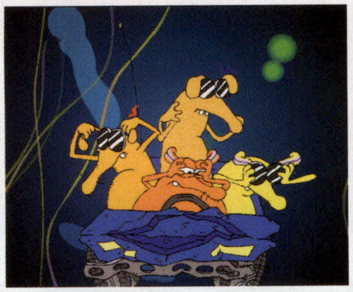

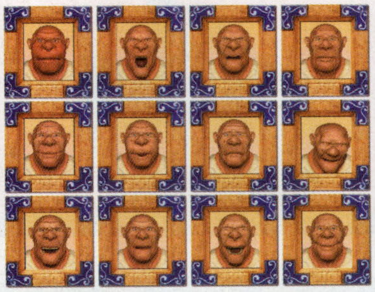

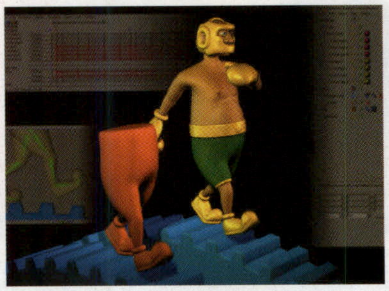

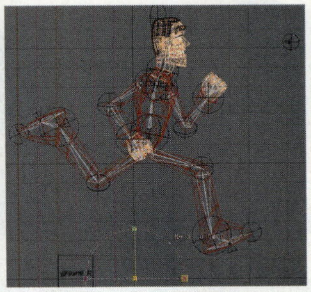

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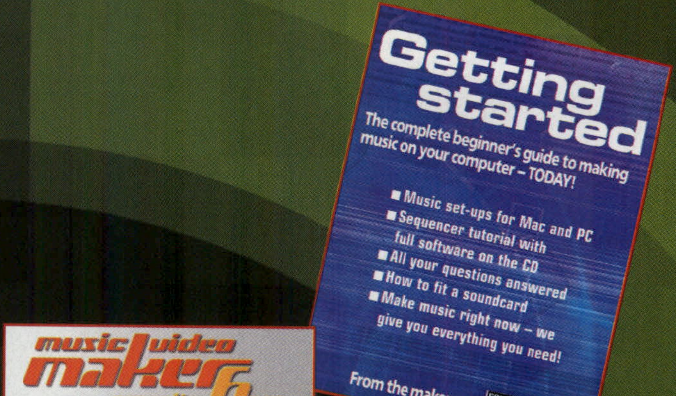

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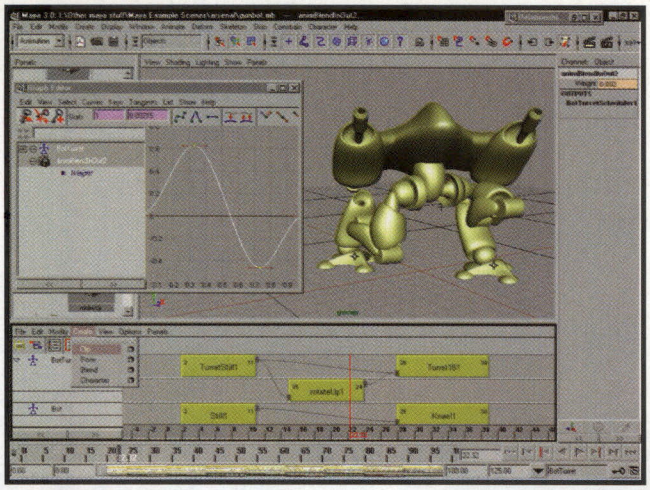
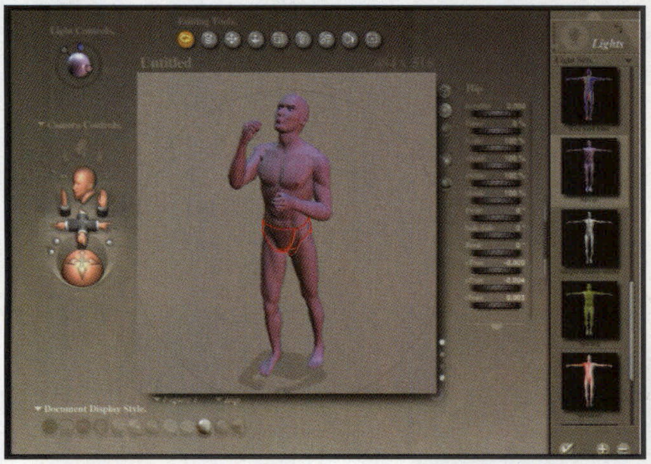


A taste of Maya



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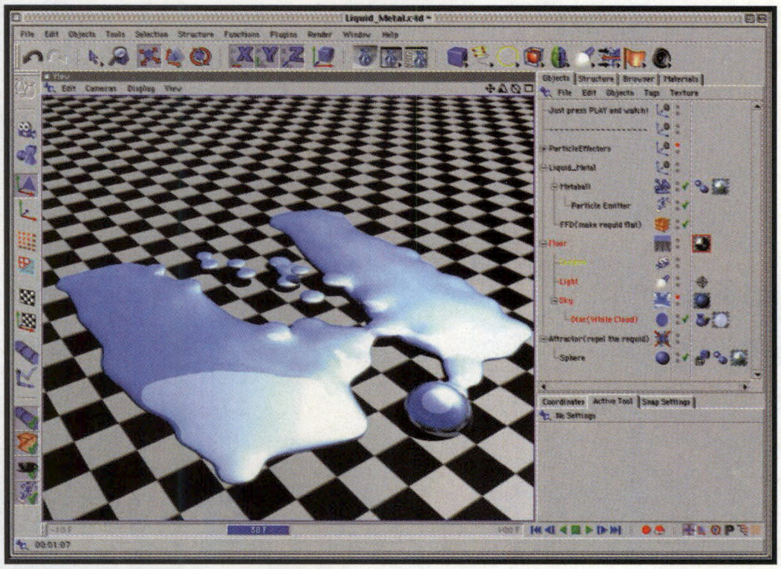

Cinema 4D XL 6.1

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A taste of Maya demo (PC)

Maya is a stunning 3D software application with a powerful set of 3D tools. It features modelling, rendering, character animation texture creation and rendering.

Poser 4 demo (dual)

Aimed at novices and pro users alike, *Poser* offers a wealth of options for creating animations and images based on human (and not-so-human) figures.

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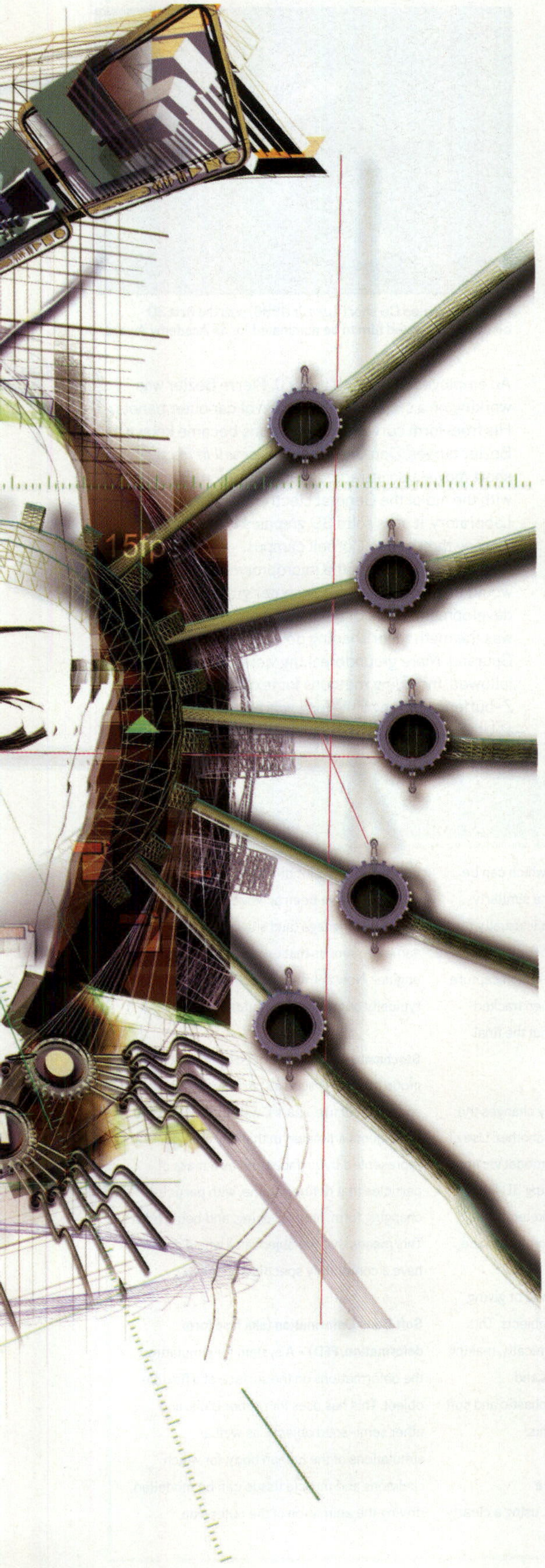


A brief history of computer graphics and animation

Mark Ramshaw traces the development of the animated image, from the Thaumatrope to Buzz Lightyear and beyond

The computer animation industry has been a long time in the making. It can be traced back much further than the movie *Tron* or even the groundbreaking cel animation of Walt Disney's early years. In fact, the roots of all animation can be located almost 200 years ago, with the arrival of a series of inventions capitalising on persistence of vision.

Persistence of vision drives all animation, whether viewed first hand, on television, or via a cinema projector. It's also what prevents everything from blacking out when we blink. Essentially POV describes the way humans see things with a certain degree of lag, with an object moving through our field of view remaining visible for a short time longer than it's really there.

The effect was first demonstrated by the Thaumatrope, thought to have been created in 1825 by John Ayrton Paris. This was basically a wooden disc fixed to two short pieces of string: it had an image of a bird on one side, and a cage on the other. When spun fast, the images from the opposite sides blurred into one to make it look as though the bird was in the cage.

Seven years later came Joseph Plateau's Phenakistiscope or Fantoscope. This was the first example of POV being used to display a real animation, making use of individual frames painted around the edge of a spinning disc. Then came the Zoetrope, Kineograph and several other optical toys, culminating in the Zoopraxiscope in 1877. This device was used to display the first moving image to depict true motion, the now legendary photographs of a horse running.

But it was the work by Thomas Edison and his team, and then the Lumière brothers (creating the cinema camera in 1895) that gave animation an environment in which to flourish.

J Stuart Blackton's animated cartoons *Humorous Phases Of A Funny Face* and *The Haunted Hotel* introduced the world to the animated cartoon in 1906. Winsor McCay's *Little Nemo* arrived in 1911, followed by *Gertie The Dinosaur* in 1913. McCay then produced *The Sinking Of The Lusitania*, arguably the first ever animated feature film (1918). Along with the introduction of J R Bray's clear plastic animation cel system and Max Fleischer's Rotoscope, the animation revolution had begun.

Cheers, big ears

While characters such as Fleischer's *Koko The Clown*, and Otto Mesmer's *Felix The Cat* achieved a degree of fame, it was Walt Disney's creations (or rather those of partner Ub Iwerks and Disney's other animators, Walt never did any of the drawing himself) that took the world of animation to the next level. Disney made his first big impression with the arrival of *Steamboat Willie* (1928). As well as being the first animated cartoon with sound, it also introduced the world to Mickey Mouse.

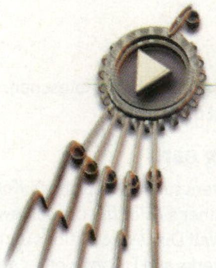
While Disney has its detractors, the studio is undoubtedly responsible for moving production out of the cottage industry phase and bringing the animated cartoon to the masses. It was also the first to fully make use of colour in its animation, as well as introducing multiplane effects to the format. Walt Disney's empire also set about creating a series of incredibly ambitious full-length animated movies, beginning in 1937 with *Snow White And The Seven Dwarfs*, though this did leave the way open for the Warner Brothers (home of Tex Avery at this time) to steal Disney's thunder in the field of animated shorts. It's Warner's output, along with that of Hanna Barbera, that has had the most influence on modern day cartoon animation, stylistically at least.

With the arrival of *Tetsuwan Atom* in the early 60s, anime took hold in Japan, though by this time the seeds of computer animation were already sown. In fact, Whirlwind, the first computer graphics system had been developed back in 1941, and used a decade later to display radar flight data.

Then, in 1960 DEC introduced the PDP-1 computer. It was to become a mainstay of the early computer graphics scene, and was the platform on which Massachusetts Institute Of Technology student Steve Russell created Spacewar, the world's first video game (1961).

That same year, fellow MIT-er Ivan Sutherland developed the landmark drawing program *Sketchpad*, Steve Coons introduced a system for the representation of segments and patches used to assemble curves and surfaces, and cinema audiences got their first taste ➤

Buzz Lightyear made his screen début in Pixar's feature-length computer animated movie *Toy Story* (1995), © Disney/Pixar



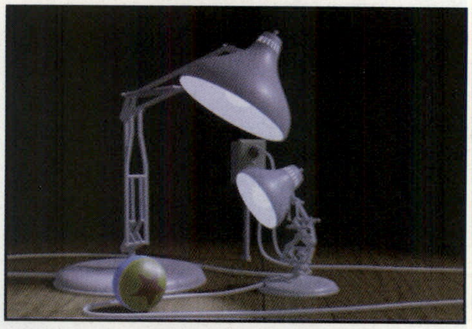
of (analogue) computer graphics courtesy of the title sequence to Hitchcock's *Vertigo*.

Over at the Bell Telephone Laboratory (where in 1965 the first computer animation language, BEFLIX, was developed) scientists began to use computer animation proper to illustrate physical simulations, such as the giro-control of a satellite orbiting the Earth, while Boeing, Sperry Rand, General Electric, the Lawrence Radiation Laboratory and several others began to realise the potential of computer animation for serious applications.

Utah saints

By 1967 General Electrics had created a computer graphics flight simulator for NASA, while Ivan Sutherland had moved over to the University Of Utah. UU soon became a hotbed for computer graphics innovation. Students included future Silicon Graphics founder Jim Clark, and Ed Catmull, co-founder and president of Pixar. Many advances in 3D were made at the university around this time, including the development of a hidden surface algorithm (created by Catmull), for removing occluded objects in a scene.

1969 was another frenzied year, with Nolan Bushell introducing the Computer Space video arcade game (Pong would follow three years later), MAGI creating the very first CG-based advert (for IBM), and Xerox developing the Graphic User Interface. It was also this time that the industry's own graphics committee changed into SIGGRAPH, the Special Interest Group on Computer Graphics and Interactive Techniques.



Pixar's animated CG short *Luxo Jr* (1986) was the first 3D computer animated film to be nominated for an Academy Award.

An employee of Renault in 1970, Pierre Bézier was working on a system for the design of car outer panels. His free-form curve representations became known as Bézier curves. Don Greenberg's *Cornell In Perspective* short movie also attracted much attention. Produced with the aid of the General Electric Simulation Laboratory, it uses solid 3D graphics to simulate a journey through the Cornell campus.

The introduction of the microprocessor in 1971 would further accelerate computer graphics development, while in theory terms, the next big event was the method for shading polygons devised by Henri Gouraud. More groundbreaking work from Catmull followed, including methods for texture mapping and Z-buffering. Phong Bui-Tong was another programmer at Utah. His Phong specular shading algorithm remains

Animated talk, some key terms

Articulated Animation – Articulated models consist of connected segments, with motion in one segment causing some degree of motion in the linked areas. The two methods used to resolve the relationships between these segments are Forward kinematics and Inverse kinematics. Forward kinematics uses the angles in joints to move the articulate structure appropriately. On a human model this would have the shoulder socket and then the elbow affecting the final position of the hand. Inverse kinematics works by taking the position of the 'end effectors' (in this case the hand), and using this to calculate the joint angles. IK is undoubtedly more useful for the animator, but harder to resolve satisfactorily.

Behavioural Animation – A system for automatically animating an object, behavioural animation is used to simulate the movement of each member of a flock of objects (typically CG animals) depending on environment, its own laws of motion, and its relationship with other members of the flock. This will typically be determined by distance from other members of the flock, and the general direction other flock members are headed in.

High/Low Level Animation – A high level animation system is one in which the animator can control the motion using abstract controllers, with animation rules and constraints defining how these controllers animate the object(s). A low level system requires the animator to specify the parameters for movement of each object.

Keyframe Animation – A method for specifying specific animation data for some frames only, with the animation application generating the data for the frames in-between.

Motion Capture – Another system for generating naturalistic animation data, motion capture techniques track the movement of actors or other objects in 3D space for digital playback in real-time or after-processing. Capture typically involves obtaining the co-ordinates for key vertices, which can be used to drive the animation for a similarly composed CG model. The data is usually obtained using an electromagnetic or optical system. The two downsides to motion capture are the problems that occur when tracked areas are occluded, and also that the final output is a rigid data set.

Morphing – Morphing gradually changes the model shape from one state to another. Use of morph targets to directly alter model vertices is the traditional way of animating 3D figures in computer games, although skeletal animation is becoming more commonplace.

Procedural Animation – A method of giving some animation control to the objects. This enables them to respond dynamically, making it ideal for simulating collisions and deformations. Behavioural, stochastic and soft body animations make use of this.

Scripted Animation – Refers to a non-adaptive way of animating, using a clearly defined method for directing animation. Once this would have been achieved using a scripting language (and still is for some video game sequences that use a real-time 3D engine). Now animation packages will typically output the animation script.

Stochastic Animation – Used to control a group of objects such as particles, for the animation of fire, sparks, water, clouds and so on. Objects animated in this way are not represented by surfaces, but as a mass of particles that define volume, with particles changing form, moving, dying, and being born. This means that the object as a whole doesn't have a completely specified shape.

Soft Body Deformation (aka free form deformation, FFD) – A system for simulating the deformations on the surface of a flexible object. This has uses for rubber balls, and other semi-solid objects, as well as simulations of the human body, for which skeletons and muscle tissue can be modelled, driving the animation of the outer skin.

a powerful, but expensive technique today. Over at Syracuse, Rich Riesenfield built on the work of Bézier to develop B-splines. And in cinemas, computer graphics made another brief appearance, this time with the use of 2D CG in a scene from the 1973 movie *Westworld*. Its sequel, *Futureworld*, arrived a year later, complete with 3D CG, courtesy of Triple I (Information International Incorporated).

Big apple

With Catmull, and several other leading lights of Utah University defecting to the New York Institute Of Technology, the East Coast lab soon became the new focus for computer graphics developments. Initially, efforts were focused on 2D work to assist traditional animation, with tools developed at the time including Alvy Ray Smith's 24-bit colour paint package, and 'Tween', a system for automatically creating the frames between two pre-drawn pieces of line art. A tool for scanning hand-drawn artwork and then digitally painted, it was also developed at the NYIT, the system eventually leading to Disney's Computer Animation Paint System.

Meanwhile, another University Of Utah graduate, James Blinn, had moved on to to the California Institute Of Technology, angling to get into NASA's Jet Propulsion Laboratory. Once there he made use of the texture mapping techniques he'd learned at Utah to create the groundbreaking Voyager flyby animations (1977). Seen by millions worldwide, they remain some of the most memorable CG animated sequences ever created. He also put forward techniques for Environment mapping and Bump mapping, a method for simulating bumps and wrinkles on a surface without the need for time-consuming geometric modifications.

Before long, NYIT was also working with 3D computer graphics, and its founder Alexander Schure even had plans to put together a full-length computer graphics-based movie. But after two years work on the film it was clear that, while the lab had the technical expertise, it didn't have the movie-making know-how necessary to create a film. Disillusioned, Ed Catmull and a handful of other employees accepted an offer from George Lucas to help set up a computer graphics division within Lucasfilm. In 1979 Industrial Light & Magic was born.

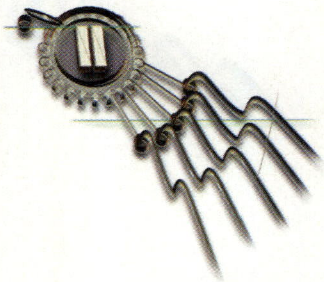
Moving pictures

Star Wars had briefly employed computer graphics for the scenes depicting a Death Star simulation (the Graphics Symbiosis System developed at Utah State in 1972 was used to create these), and Triple I had got as far as producing a sequence featuring several flying space craft, with a view to using them rather than models for *The Empire Strikes Back*. But it was the formation of Lucasfilm's own CG division that made all the difference: to the studio's own work and the CG industry in general, heralding a shift from academically-driven development to a commercially-driven model. From here on in, the needs of the movie industry (and latterly TV, video and advertising) have been largely responsible for the technological advances in CG animation.

And if the talent being amassed at ILM didn't initially make people sit up and take notice of the potential for Hollywood to utilise CG, the arrival of *Tron* in 1982 certainly did. Although *Looker* arrived a year earlier, sporting a virtual human character, *Tron* was the first movie to really demonstrate the power of 3D computer animation. With 15 minutes of CG sequences developed by four studios - Digital Effects Incorporated, Robert Abel & Associates, Triple I, and Mathematical Applications Group Incorporated (MAGI) - it was a fantasy movie and showreel in one.

1982 also saw the introduction of Ohio State's Skeletal Animation System, Tom Brigham's Morphing techniques (popularised by the movie *Willow* some ten years later), plus the launch of Silicon Graphics Inc. Its first graphics workstation, the SGI IRIS 1000 was instrumental in bringing computer animation tools to a new generation of artists, as were the first two commercially available 3D modelling and ➤

Directed by Chris Wedge, one of the founders of Blue Sky Studios in 1987, *Bunny* makes use of radiosity to mimic natural light.



Pixar's Geri's Game, which won an Oscar for best animated short film in 1997, was notable for the way it depicted skin and cloth.

Where next for computer animation?

CG at the movies in the coming months

Shrek (June 2001) – PDI/Dreamworks releases its second full-length CG animated feature. Around ten times more ambitious than *Antz*, *Shrek* features advanced skin, fluid, and fire modelling techniques, as well as characters driven by a full skeleton, muscle and fat-based animation system.

Final Fantasy (July 2001) – Square takes its award-winning computer game series to the movies, for an animated film boasting complex human CG models. Whereas PDI/Dreamworks' *Shrek* is completely hand-animated, Square has made extensive use of motion capture.

Monsters Inc (2001) – Pixar's next biggie is another highly stylised CG cartoon, with Billy Crystal and John Goodman providing the voices for the two monstrous lead characters.

Atlantis: The Lost Empire (2001) – Disney's next animated movie blends 3D computer animation with traditional animated work.

The Lord Of The Rings: The Fellowship Of The Ring (Dec 2001) – Peter Jackson's Weta Digital outfit is providing the armies and CG effects for the first in the *Tolkein* trilogy.

Ice Age (2001) – Blue Sky's first full-length movie for parent company Fox uses the proprietary CGI Studio system to animate the adventures of a pack of mammoths.

Tusker (2002) – The next project in the works at PDI/Dreamworks. Featuring a herd of computer animated elephants, it looks set to rival *Ice Age*.

Star Wars Episode 2 (2002) – Although ILM has a hand in countless movies over the coming year, the next epic from George Lucas will undoubtedly be the one to watch.

Finding Nemo (2003) – Pixar is set to try its hand at a less comedic CG cartoon, with this tale of a clownfish taken from the safety of his coral reef.

animating applications, *Wavefront* and the spline-based *Alias/1* (Alias shrewdly allying itself with SGI to maximise sales). Motion capture also made its début around this time, with the Polhemus 3Space Digitiser and Body Tracker from McDonnell Douglas, while at Cornell University Don Greenberg introduced a method for scene modelling using radiosity. Computer animation even infiltrated the world of music videos at this point, with Rushes Postproduction putting together the *Money For Nothing* promo for Dire Straits. Handling the computer graphics on that project was Ian Pearson, who went on to form Vancouver's Mainframe, creators of *Reboot* and several other CG cartoons for television.

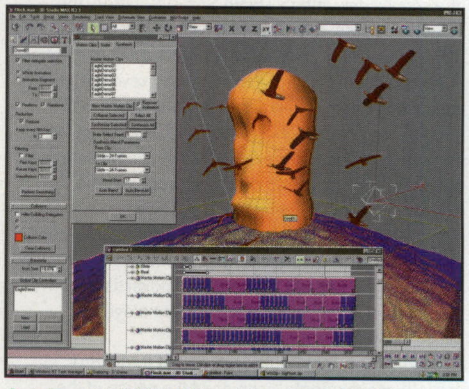
Toy town

Meanwhile, work at LucasArts was continuing apace, with the development of techniques for Particle Systems, Motion blur and distributed raytracing (an improved version of the tracing put forward by Turner Whitted of Bell Labs in 1980), as well as the creation of the REYES renderer (a forerunner of *Renderman*). ILM's first movie project was for *Star Trek II: The Wrath Of Khan*, the team put together a sequence that depicts the accelerated terraforming of a planet. *Young Sherlock Holmes* followed, for which ILM created a CG knight that emerges from a stained glass window.

Working on that project was John Lasseter. When Steve Jobs purchased ILM's CG division in 1986 to form Pixar, Lasseter and Catmull also made the switch. With these two twin talents, Pixar went on to be nominated for an Academy Award for its CG short *Luxo Jr* (and win more awards for projects such as *Tin Toy* and *Red's Dream*), shifting the goal posts for pure CG animation in the process. Disney was also making progress, utilising CG for its *The Great Mouse Detective* film. And with the arrival of *Softimage Creative Environment* (later called *Softimage|3D*) artists were given another powerful tool for modelling and animation.

And still the innovations continued, with Craig Reynolds developing his 'boids' flocking algorithms (seen in *Stanley And Stella In: Breaking The Ice*), Lorenson and Cline publishing a SIGGRAPH paper on voxels and the 'marching cubes' high order surface

Due for release in the summer 2001, *Shrek* is PDI/Dreamwork's second full-length CG animated feature.



Craig Reynolds 1986 'boids' model was featured in *Stanley and Stella in: Breaking the Ice*, first shown at SIGGRAPH 87.

algorithm, and Disney and Pixar completing work on the Computer Animation Paint System. Pixar was also soon to launch its excellent Renderman system.

For Hollywood, the next big breakthrough came with *The Abyss* in 1989. For the film, ILM created a creature composed of 'solid' water, using the Patch-based format of the *Alias 2.4.2* software. The techniques developed for the movie were further refined on *Terminator II: Judgment Day* two years later. The work needed to depict the liquid metal proved so expensive that even Schwarzenegger's fee paled in comparison. After *T2*, computer animated effects would be a must for almost every big budget Hollywood movie.

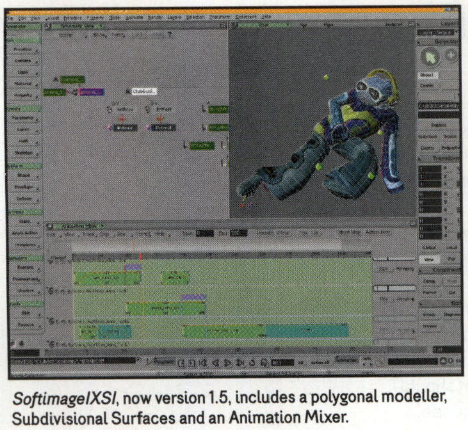
Autodesk's *3D Studio* arrived in 1990. Only the second 3D package to be written for DOS-based PCs, it brought 3D modelling and animation within the reach of every computer user. As successive editions of *3D Studio* built on these foundations, rival packages would start to see the advantages in producing applications for this more affordable platform.

Computer animation was again employed by Disney, for *Beauty And The Beast*, while the schlock sci-fi of *The Lawnmower Man*, used CG to depict a bizarre kind of virtual reality. Then in 1993, came Steven Spielberg's latest blockbuster, *Jurassic Park*. *Terminator II* had been impressive, but this was something else, demonstrating that CG could make the impossible seem totally real.

In fact Spielberg had intended shooting the movie using traditional modelmaking, hiring Stan Winston to create full-scale dinosaurs, and Phil Tippet to handle stop-motion action. But over at ILM the animators began to experiment, impressing Spielberg so much that he scrapped all plans to use stop-motion. Using *Softimage|3D* (making use of the recently added Inverse kinematics support), Alias *PowerAnimator* and (for a number of scenes) motion data obtained using a device developed by Tippet, ILM was able to create a range of convincing dinosaurs. Spielberg even added extra scenes to take advantage of the technology, including the showdown between the T-Rex and Velociraptors. Not surprisingly, ILM's work won an Oscar the following year, while Softimage was subsequently snapped up by Microsoft. Other changes included the merging of Wavefront and Alias.

After the dry run of CG shorts in the late 80s, Pixar was finally ready to move into the full-length movie business. In partnership with Disney, it unveiled *Toy Story* in 1995. It was the world's first 100 per cent computer animated film. The graphical style may have been whimsical rather than realistic, but that was the intention. Where other movie computer graphics attempted to blend in with live action, *Toy Story* used cutting-edge CG techniques as an alternative to traditional animation.

This was also the year in which NewTek introduced its *LightWave 3D* animation system. Based on a version originally included with its Video Toaster product, *LightWave* brought pro-level 3D tools to the Amiga computer for the first time, with PC and Mac versions following shortly after.



Softimage|XSI, now version 1.5, includes a polygonal modeller, Subdivisional Surfaces and an Animation Mixer.

Breaking the surface

Further refining its *Renderman* technology with the additional of Subdivisional Surfaces (premièred in the CG short *Geri's Game*), Pixar set to work on its second movie, *A Bug's Life* (1997). Having moved into digital effects in 1990, Pacific Data Images followed suit, creating the equally impressive *Antz* for Dreamworks. The launch of Alias|Wavefront's *Maya* put yet more powerful tools in the hands of animators, with ILM just one of many major CG studios to quickly adopt it.

That studio flexed its animating muscles even further, creating the CG synthetic thespian' Jar Jar Binks, plus a multitude of other CG effects for *Star Wars Episode One: The Phantom Menace* in 1999, and Pixar continued its winning run with *Toy Story 2*, a sequel that managed to best its predecessor in terms of story and technology.

And at the Oscars, Blue Sky, another veteran CG studio collected its first Academy Award for its *Bunny* short. A CG cartoon boasting excellent lighting and fur effects, it makes use of the studio's own proprietary raytracing-based rendering system, *CGI Studio*. Blue Sky also contributed some effects to Don Bluth's *Titan AE*, an ambitious film blending 3D computer animation with traditional 2D cel art.

And onwards the CG animation industry moves, with Hollywood ever more reliant on digital expertise, and video game developers also making ever more use of the modelling and animation tools. Recognising this, the major 3D application companies have begun to provide increased support for this market, giving computer animators the tools necessary to create models and sequences for real-time playback.

And with each new software revision and plug-in release the tools become more powerful. Softimage has introduced Subdivisional modelling and a host of other new features with its *Softimage|XSI* package. (Disappointingly, the much-delayed first release lacked any modelling tools, though the more recent 1.5 edition rectifies this). Autodesk/Discreet's new *3ds max 4* also adds Subdivision Surface support, along with an improved Inverse kinematics system.

In less than 200 years, animation has evolved from running figures on a spinning wheel to computer-generated imagery so complex it's almost impossible to tell what is artificial and what is real. And the tools used to model and animate CG have reached a level of sophistication that it's now possible to create almost anything imaginable, no matter how lifelike or outlandish. Where computer animation goes next is now in the hands of the artists.

Expertise provided by Mark Ramshaw [e] markramshaw@email.com

Square's *Final Fantasy: The Spirits Within*, due out in July, uses motion capture techniques as well as hand animation.

Web links

Discreet (makers of *3ds max*)	www.discreet.com
SIGGRAPH	www.siggraph.org/index.html
Alias|Wavefront	www.aliaswavefront.com
Softimage	www.softimage.com
New Tek (makers of *LightWave*)	www.newtek.com
Silicon Graphics	www.sgi.com
Ohio State University	www.osu.edu/index.php
New York Institute Of Technology	www.nyit.edu
California Institute Of Technology	www.caltech.edu
Massachusetts Institute Of Technology	www.mit.edu
Industrial Light & Magic	www.ilm.com
Pixar	www.pixar.com
Blue Sky Studios	www.blueskystudios.com
PDI/Dreamworks	www.pdi.com
Square (USA)	www.squareusa.com
Craig Reynolds' boids home page	www.red3d.com/cwr/boids
Jim Blinn home page	www.research.microsoft.com/users/blinn
A useful timeline	www.cgrg.ohio-tate.edu/~waynec/history/timeline.html

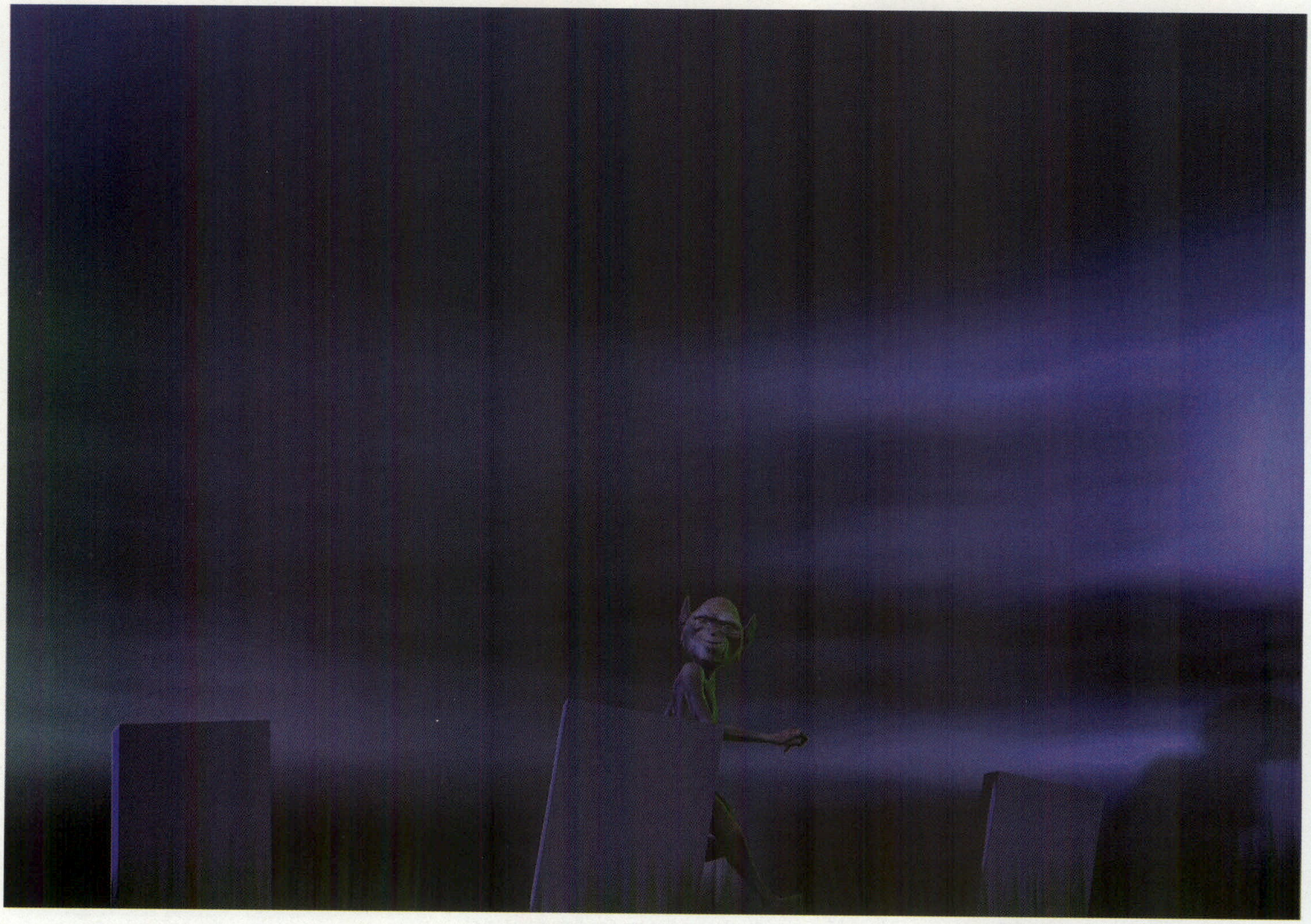


Illustration: Martin Gisbourne [e] martin@carbonblack.com

Animate a gremlin in Poser

Martin Gisbourne reveals how to build atmospheric scenes and animations directly within *Poser*

Expertise provided by Martin Gisbourne [e] martin@carbon black.com

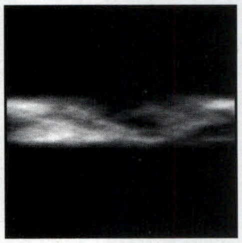
The tutorial files are on the CD in the **Dual\tutorial\Poser Gremlin** folder. *Poser 4.03* costs approx £164, for more details [w] www.unlimited.co.uk

In this tutorial we are going to explore some of the deeper features of *Poser 4* and try to show how complex scenes and animations can be built directly within the application. The only elements created outside of *Poser* are the Transparency maps which were created in *Photoshop 6* (although any image editing or painting package can be used to create these maps). We are going to build a short clip featuring our DAZ3D model, the gremlin. We are going to make him sneak around, loiter and sneak around some more, all within the creepy setting of a foggy graveyard.

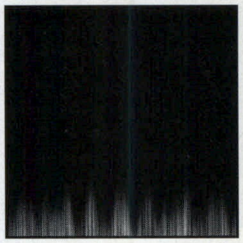
We hope to show just how powerful *Poser 4* is and just how creative you can get without resorting to any post-production apps at all. Using the Materials editor and the Keyframe Animation timeline we are going to produce an atmospheric clip that should be easy to follow but wide in its scope.

Part 1: Setting the scene

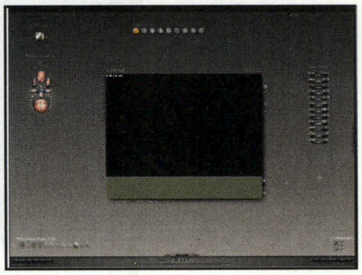
Start by rendering your grass image and adding the gravestones



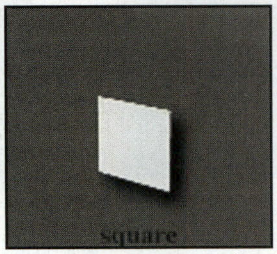
1 Using any image editor or painting application, create an image 512x512 pixels. Ensure that the Image mode is set to greyscale. Make sure, also, that the top and the bottom of the image go to full black. This is the Transparency map we shall use for the fog effect.



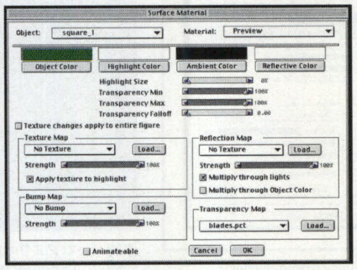
2 Next create an image the same size but this time with full black starting at the top moving through to full width at the bottom. This will be the Transparency map for our foreground grass. Make sure that you save these two images with sensible names!



3 Open *Poser 4* and delete the central character – we will incorporate our gremlin when the scene is set. Click on the background colour swatch and set it to black. Next press Apple-G (or Ctrl on Windows) to display the ground plane.



4 Expand the Libraries tab, select Props and double-click on the Square object. Then click Apple (Ctrl)-U to bring up the Surface Materials window – this is going to be the basis of our grass.



Surface Material

Object: square_1

Material: Preview

Highlight Size 0%

Transparency Min 100%

Transparency Max 100%

Transparency Falloff 0.00

☐ Texture changes apply to entire figure

Texture Map: No Texture

Strength 100%

☒ Apply texture to highlight

Bump Map: No Bump

Strength 100%

Reflection Map: No Texture

Strength 100%

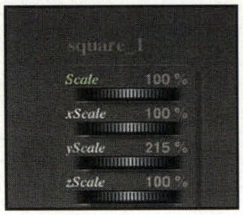
☒ Multiply through lights

☐ Multiply through Object Color

Transparency Map: blades.pct

☐ Animateable

5 Making sure that square_1 is selected, load the Transparency map with your grass image and set Transparency Min and Max to 100 per cent, Falloff should be 0 per cent. Also change the Object colour to a dark green and take the Highlight Size down to 0 per cent.



square_1

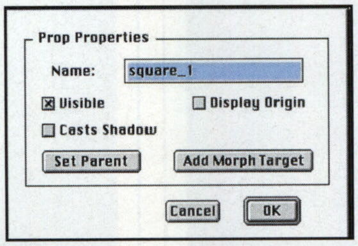
Scale 100 %

xScale 100 %

yScale 215 %

zScale 100 %

6 Do a quick render to see how your grass looks. If, like ours, the grass is too short then extend the 'yScale' parameter. We increased ours to about 215 per cent.



Prop Properties

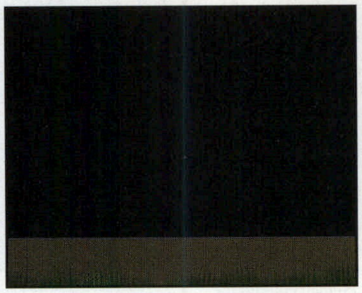
Name: square_1

☒ Visible

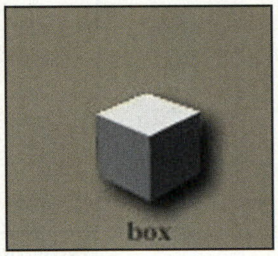
☐ Display Origin

☐ Casts Shadow

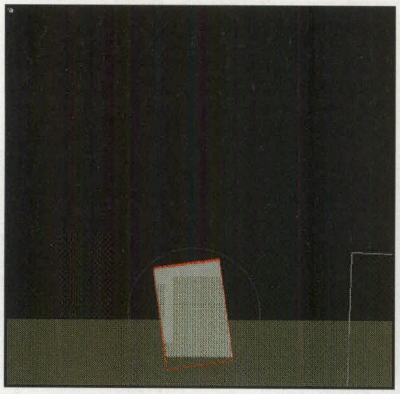
7 Rendering the image now shows that we have good-looking grass but an unlikely-looking box shadow. We need to make the object's shadows invisible. Apple (Ctrl)-I brings up the Prop Properties – uncheck the Casts Shadow button.



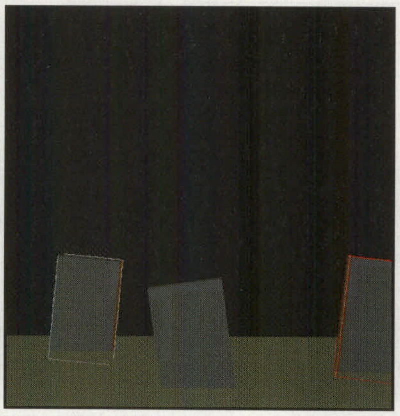
8 Next you need to replicate steps 4–7 about 10 times adding in little twists and variations in scale to give a reasonable front line of grass.



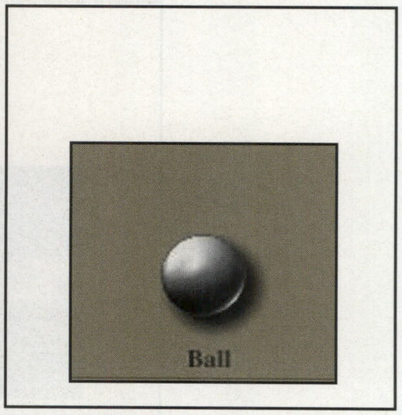
9 Using a similar technique we want to build a number of gravestones for our scene. Don't worry about the lighting just yet. From Props, double-click on the 'box' prop.



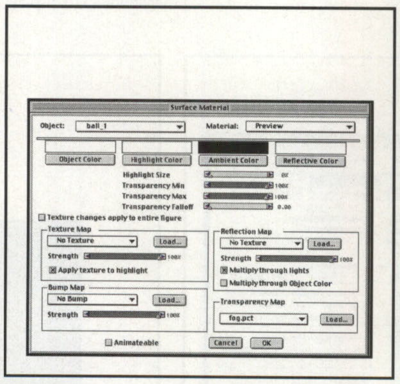
10 Hit the Z key for Translate In/Out and move the box back in our scene. Next scale the box using the parameter dials – xScale=150 per cent, yScale=230 per cent and zScale=35 per cent. Also zRotate to 8_ and yTran down to -0.020.



11 Set the Object Color to a mid-tone grey in the Surface Materials window and repeat steps 9 and 10 two or three times. Place the stones a little randomly and at different angles.



12 Now for the fog creation. Double-click the Ball prop in the Props library. Set the Scale parameter to 2000 per cent, the yTran to -1 and the zTran to 0.550.



Surface Material

Object: ball_1
Material: Preview

Highlight Size 0%
Transparency Min 100%
Transparency Max 100%
Transparency Falloff 0.00

☐ Texture changes apply to entire figure

Texture Map: No Texture
Strength 100%
☒ Apply texture to highlight

Reflection Map: No Texture
Strength 100%
☒ Multiply through lights
☐ Multiply through Object Color

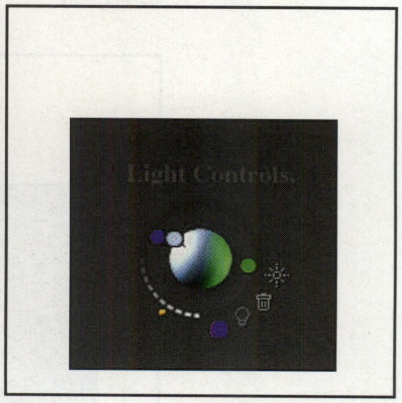
Bump Map: No Bump
Strength 100%

Transparency Map: fog.pct

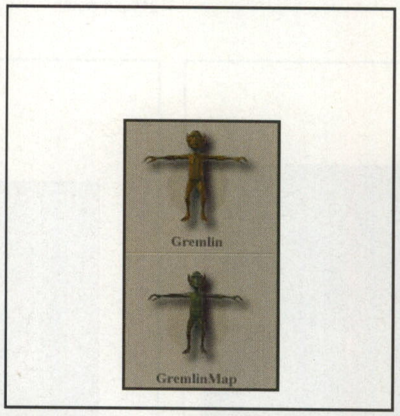
☐ Animateable

13 Now open the Materials (Apple/Ctrl-U). Import the image created in step 1 into the Transparency map. Set the Transparency Min and Max to 100 per cent, Falloff to 0 per cent and Highlight to 0 per cent.

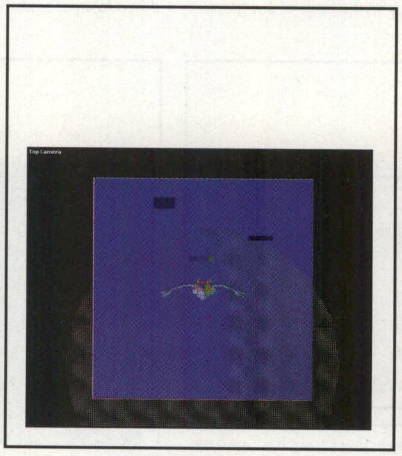
14 Next get the property info for the ball of fog and uncheck the Cast Shadows buttons. Render and witness the creepy graveyard taking shape. There are a number of rendering problems to take into account here but they will be gone by final camera placement.



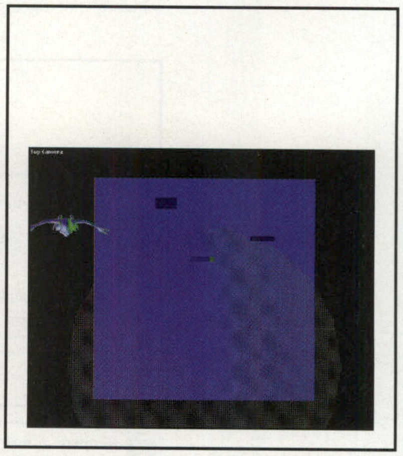
15 Let's now concentrate on getting some better lighting. Without moving the lights, click on each in turn and set two to a blueish tinge and the third to green.



16 We now have a reasonable looking graveyard so it's about time our gremlin entered the scene. Assuming you have installed the gremlin from the CD he should be sitting in the Zygote Characters library. Double-click Gremlin map to bring him into the scene.



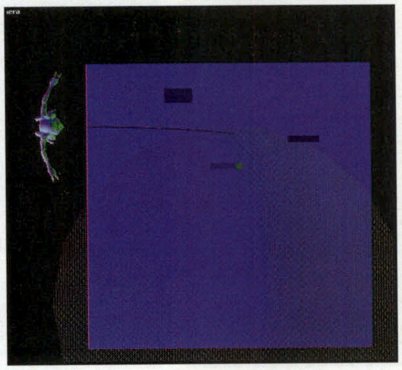
17 Select the Top Camera from the camera controls and zoom out. We are going to have him walk into the scene, pause and then walk on again – walking in and out of the gravestones.



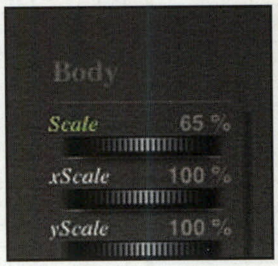
18 In the Top view, move our gremlin over to the left side – use the Parameter dials to achieve the best accuracy (this is also assists with selecting the whole object – Figure 1 – Body).

Part 2: Animating the gremlin

Creating a walk path across 200 frames to get our gremlin moving



1 Rotate the gremlin to face into the scene and create a walk path (Figure>Create walk path from the menu). Use the Alt key on the path points to delete them until your path looks like the one in the figure.



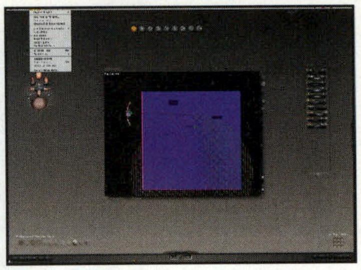
Body

Scale 65 %

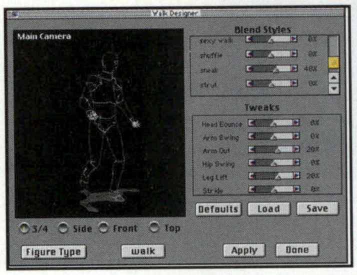
xScale 100 %

yScale 100 %

2 At this point, scale your entire gremlin down to about 65 per cent using the Parameter dial for Scale.



3 Now we have scaled the character down, we need to make sure that he is still planted on the floor. This can be achieved by using Figure>Drop to floor.



Walk Designer

Main Camera

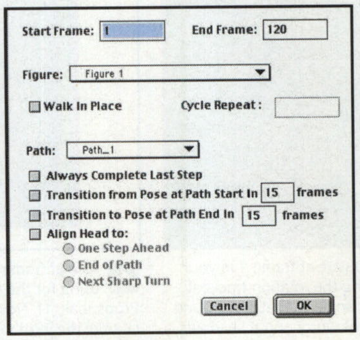
Blend Styles

- sexy walk 0%
- shuffle 0%
- sneak 48%
- strut 0%

Tweaks

- Head Bounce 0%
- Arms Swing 0%
- Arms Out 20%
- Hip Swing 0%
- Leg Lift 20%
- Stride 0%

4 Switch back to the Main Camera and load the walk designer (Window>Walk designer). Apply about 48 per cent of 'sneak' with about 20 per cent of 'arm out' and 'leg lift'.



Start Frame: 1 End Frame: 120

Figure: Figure 1

☐ Walk In Place Cycle Repeat:

Path: Path_1

☐ Always Complete Last Step

☐ Transition from Pose at Path Start In 15 frames

☐ Transition to Pose at Path End In 15 frames

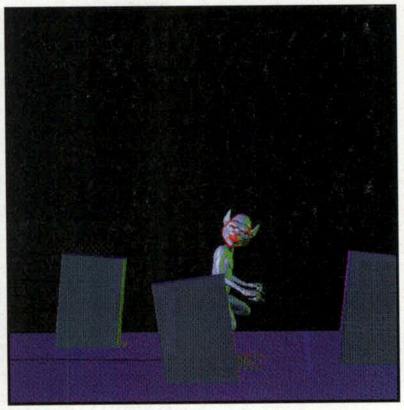
☐ Align Head to:

○ One Step Ahead

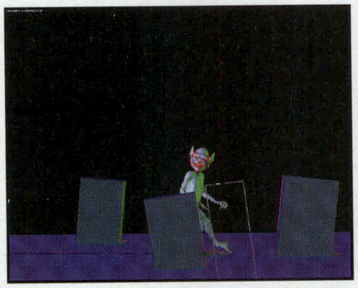
○ End of Path

○ Next Sharp Turn

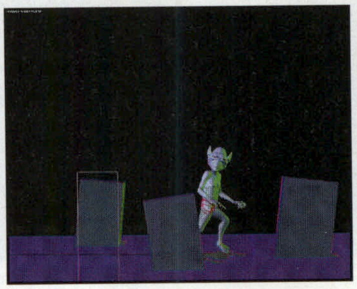
5 Hit the Apply and make sure that the animation created runs from frame 1 to 120, applied to figure 1, along path1.



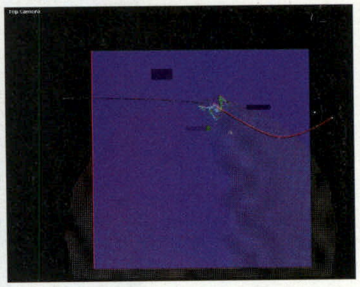
6 Now click in the Duration window of the timeline and extend the animation to 200 frames. Scrub to 130 and twist (W) the neck so that the gremlin is looking at the camera (you may have to use the Transform to turn the head).



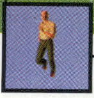
7 Scrub to 140 and dial in about 2.0 on the Smile parameter dial and move the far (left) foot forward. You can twist the torso towards camera a little here too.



8 Scrub to 150 and select the hips. Move them forwards using the Transform tool.

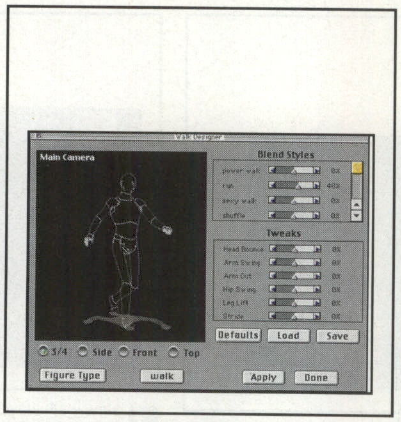


9 Scrub to 160 and create a new walk path. You will have to drag the start of the walk path to the position of our gremlin. Go to the Top Camera and make sure that our gremlin is going to walk off in the right direction.



Part 3: Testing and tidying

The animation is nearly complete – now we'll do a few test runs



Walk Designer

Main Camera

Blend Styles

power walk 0%

run 48%

sexy walk 0%

shuffle 0%

Tweaks

Head Bounce 0%

Arm Swing 0%

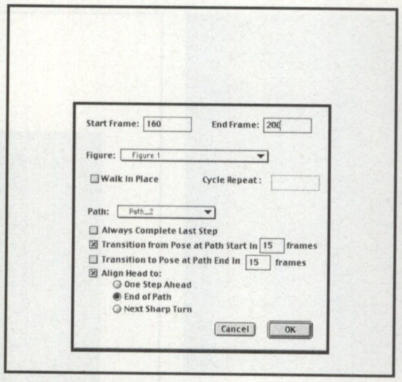
Arm Out 0%

Hip Swing 0%

Leg Lift 0%

Stride 0%

1 Go to the Walk Designer and hit the default button. Now dial in about 48 per cent of 'run' and hit the Apply button.



Start Frame: 160 End Frame: 200

Figure: Figure 1

☐ Walk In Place Cycle Repeat:

Path: Path_2

☐ Always Complete Last Step

☒ Transition from Pose at Path Start in 15 frames

☐ Transition to Pose at Path End in 15 frames

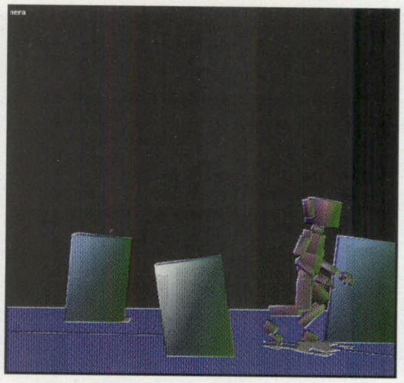
☒ Align Head to:

○ One Step Ahead

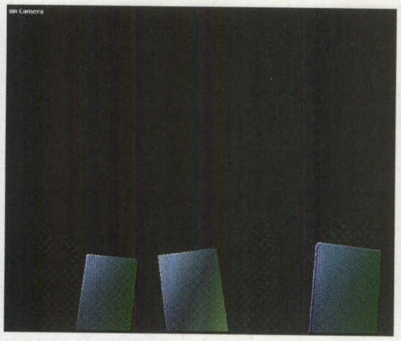
● End of Path

○ Next Sharp Turn

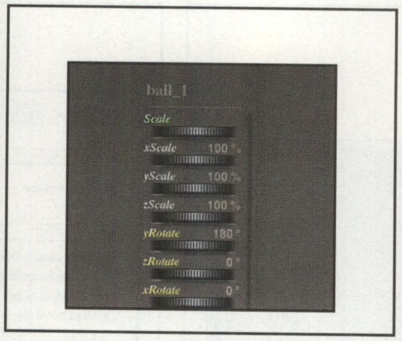
2 Apply this animation to frames 160 to 200, along walk path 2. Make sure you check the Transition from pose at first frame and align the head to the end of the path. Apply it and return to the first frame.



3 Test the animation in Fast Tracking mode. In theory we should be seeing a gremlin that sneaks into the frame, smiles and then hops off. There are two more issues that need to be dealt with at this point...



4 Firstly, ensure that you are at frame 1 in your animation. Then, using the rotation trackball, spin the camera to a lower angle so that the ground isn't seen. Now we need not worry about shadows and shadow interaction.



ball_1

Scale

xScale 100 %

yScale 100 %

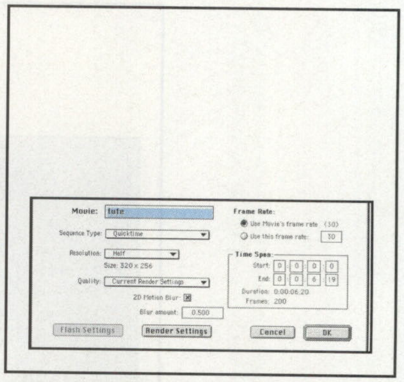
zScale 100 %

yRotate 180 °

zRotate 0 °

xRotate 0 °

5 Also at frame 1, select the Ball that we are using for the fog layer. (It should be Props>ball_1). Now scrub forward to frame 200 and change the yRotate to 180_. This will gives us the effect of having animated fog.



Movie: tute

Sequence Type: Quicktime

Resolution: Half

Size: 320 x 256

Quality: Current Render Settings

2D Motion Blur: ☒

Blur amount: 0.500

Frame Rate:

● Use Movie's frame rate (30)

○ Use this frame rate: 30

Time Span:

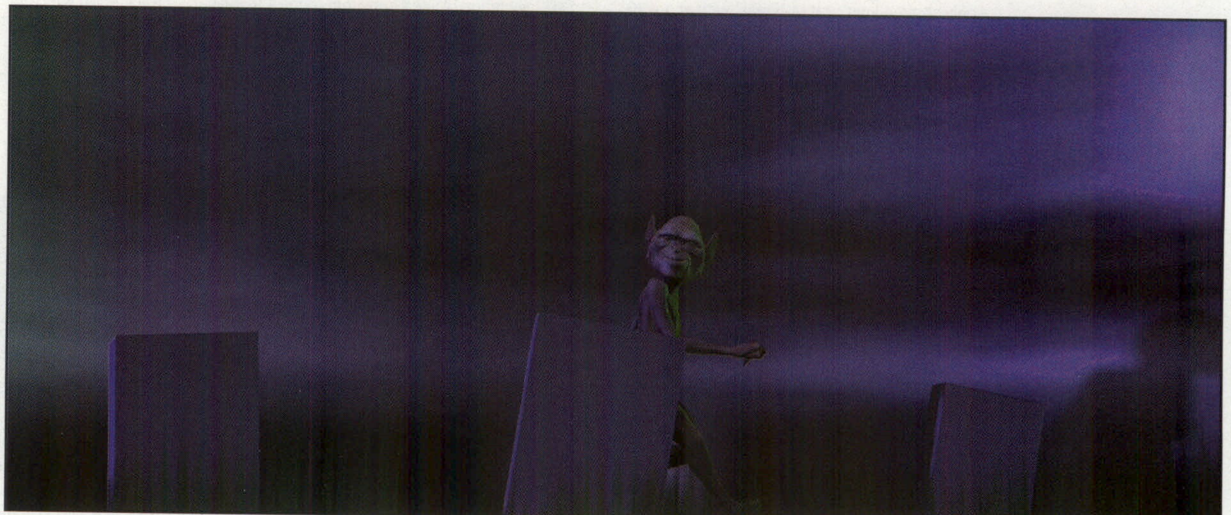
Start: 0 : 0 : 0 : 0

End: 0 : 0 : 6 : 19

Duration: 0:00:06:20

Frames: 200

6 If you have the *Pro Pack* installed into your *Poser 4*, make sure that you set the Motion blur in the Make Movie dialog.



7 Run the animation to movie. For best results, make sure that you switch on anti-aliasing although you have to bear in mind the additional render overhead this produces. Enjoy.

8 Additional changes can be made to lighting animations, perhaps moving the lights over time or changing colours.

9 Go mad with the additional characters included in *Poser*, maybe incorporating a rising skeleton from the stock libraries. ca•s

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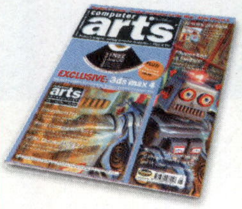

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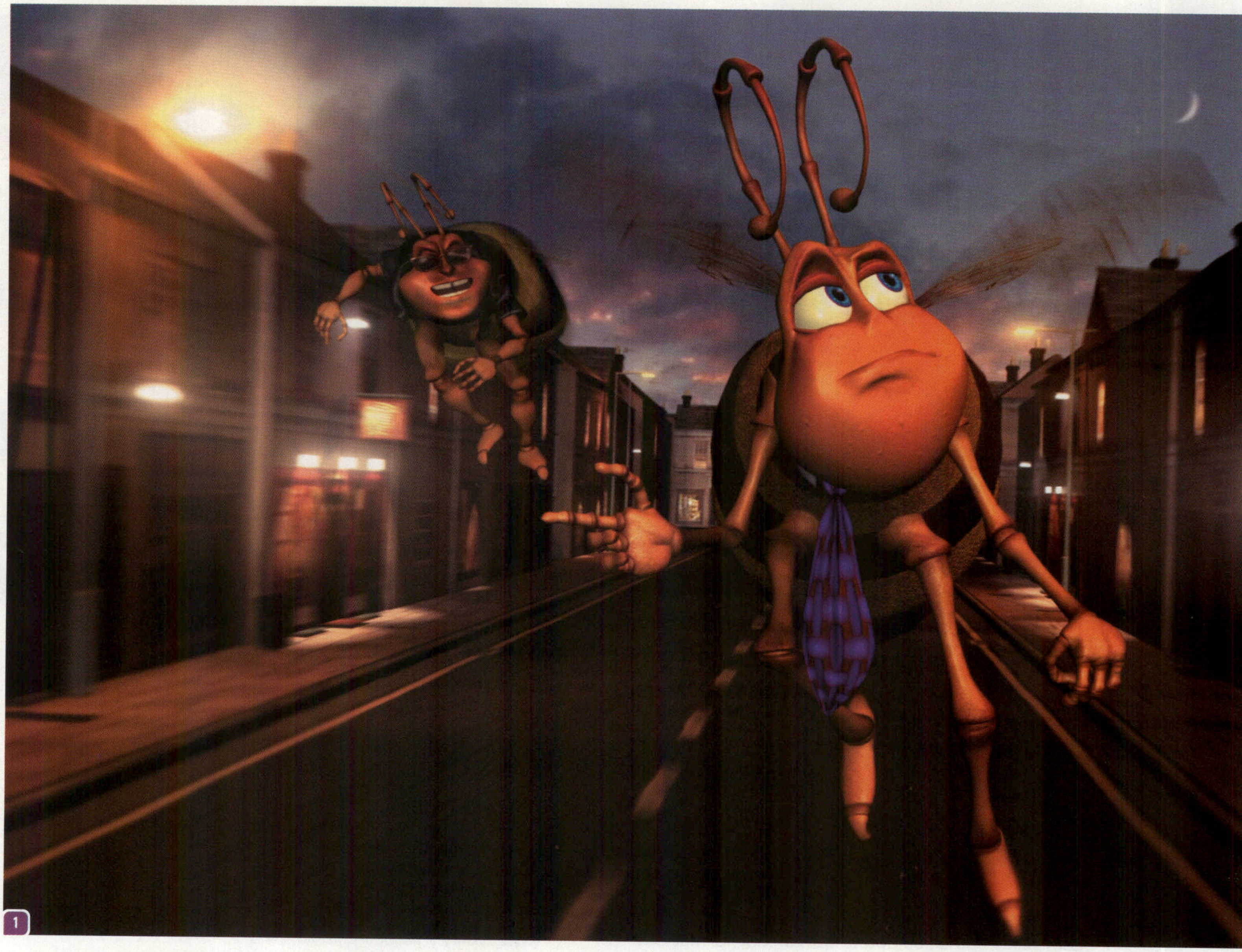

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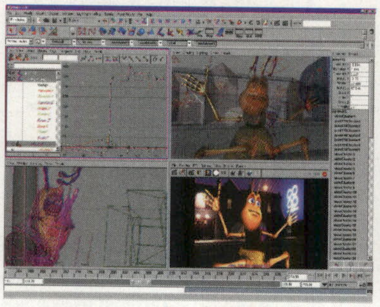
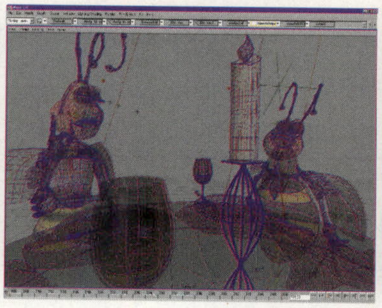
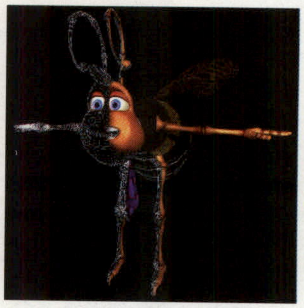






Aardman Animations

Aardman, the home of Wallace & Gromit, now has its very own CG division. Studio head Will Byles talks to Mark Ramshaw

While the claymation characters created by Aardman Animations are undoubtedly the company's calling card, the Bristol-based creative hothouse has embraced a number of different animation mediums since its inception in 1972. Work for ads, television, music promo and other formats has made use of a wide range of media, ranging from the traditional cel animation of the original Aardman superhero character to the high-tech cut and paste techniques used to create the Net-based *Angry Kid* cartoons.

The latest medium to be exploited is CG. Aardman spent almost two years setting up a new computer graphics division, and in a few short months has already produced a number of high quality ad spots for the current Co-Op campaign.

In fact Aardman resisted the idea of using CG for a long while, feeling it would be unnecessary diversion. But once it became clear that it was a medium providing a means to an end rather than a way of trying to replicate existing skills, the new technology was wholeheartedly embraced. It's also worth noting that, despite the use of clay for its most famous animation, Aardman is anything but Luddite. Much of the technology used to film such stop-motion action was developed in-house.

Heading up the CG studio is Will Byles, whose previous experience includes modelling, animating, directing and even acting. Byles and his team had the luxury of spending the first 18 months getting the department up and running, before taking on the work for the Co-Op's current ad campaign. Since beginning work on the ads, the team has expanded from five to eight.

"Having a larger team means there's less pressure to produce just one thing," says Byles. "Although the campaign is a good earner for the department, it means we now have other stuff going on, so those ads don't become the sole reason for our existence."

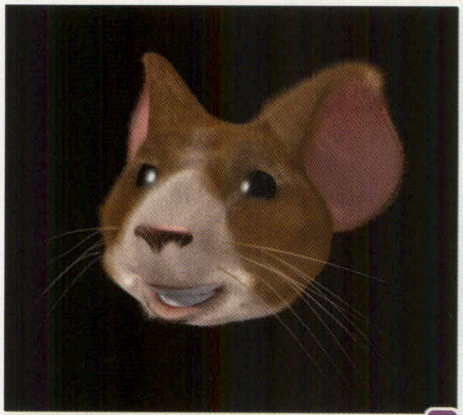
There's now time to refine the department's approach with further R&D work. "We're able to try out new ways of doing things, and experiment with new characters, visual styles and generally flex our muscles," adds Byles. "We've also got a few things in beta right now, and are pitching some ideas for the BBC's digital channels."

The studio is also diversifying. "We've started going down the *Flash* route. We have our own Web people here already, but we're looking at it more from a content perspective. At Aardman, if we can find a medium we're able to use, then we'll exploit it to the full."

There's no danger that Aardman will go into the Web design business, but there are certainly possibilities for creating Web-based animation sequences for clients. ➤

1. Aardman's first Co-op spot *Fastlane* stars Andy, a 'busy bee' so pre-occupied with the day's troubles that he almost forgets the day's shopping. This 100 per cent CGI pull back intro shot was over 100MB of data and took a week to render. *Maya*'s Motion blur was used on selective objects to give the impression of speed and urgency.

2. Andy and Karen, the bee couple, were constructed from NURBs geometry. Here we see the construction isoparms, (curves) of Andy's NURBs geometry prior to being boned and skinned for animating.



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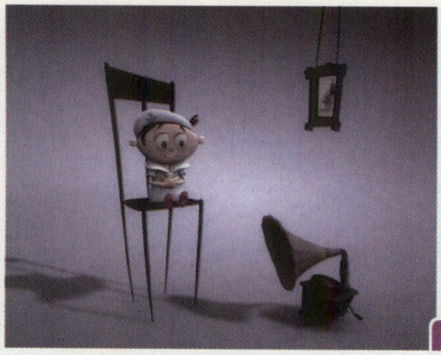

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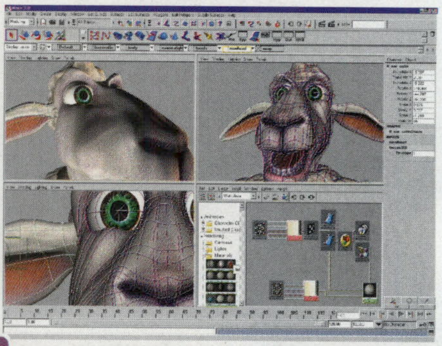


3

Aardman Animations

Contact: 0117 984 8485

Web: www.aardman.com

Awards include: Three Oscars, and four other Oscar nominations

Brief History: Formed in 1972 by David Sproxton and Peter Lord, its first project was to create the Aardman superhero for the *Vision On* TV series. Clay character Morph followed in 1976, originally for the *Take Hart* show, with a 26-part series *The Amazing Adventures Of Morph* following in 1981. *Conversation Pieces* was created the same year. Claymation video work followed, including Peter Gabriel's *Sledgehammer* (1986), and Nina Simone's *My Baby Just Cares For Me* (1987), while the *Lip Sync* series for Channel 4 arrived in 1989, spawning the world famous *Creature Comfort* ads (and bringing Aardman's Nick Park to the public's attention). In 1993 Wallace & Gromit starred in *The Wrong Trousers*. More recent characters include *Rex The Runt* and *Angry Kid*, while Aardman has also made its first full-length feature, *Chicken Run*.

It's intended that the studio will continue to expand steadily, finding recruits who want to come on board for the long term. "Within this industry people tend to chop and change. It's just the nature of the business. But we really want people to hang on in here. That way they get a degree of ownership over the work we produce. And working with a close-knit team rather than a continually fluctuating one obviously makes for a better way of working and developing ideas."

New blood also means we can expect to see the visual style of the studio's output evolving. "Everybody who joins is bringing their own style and design techniques to the work. I'm not aiming for a unifying style to all our projects, there isn't the need for a homogenised style. That's a perception people sometimes have about Aardman in general, but really the company's styles are wide and varied."

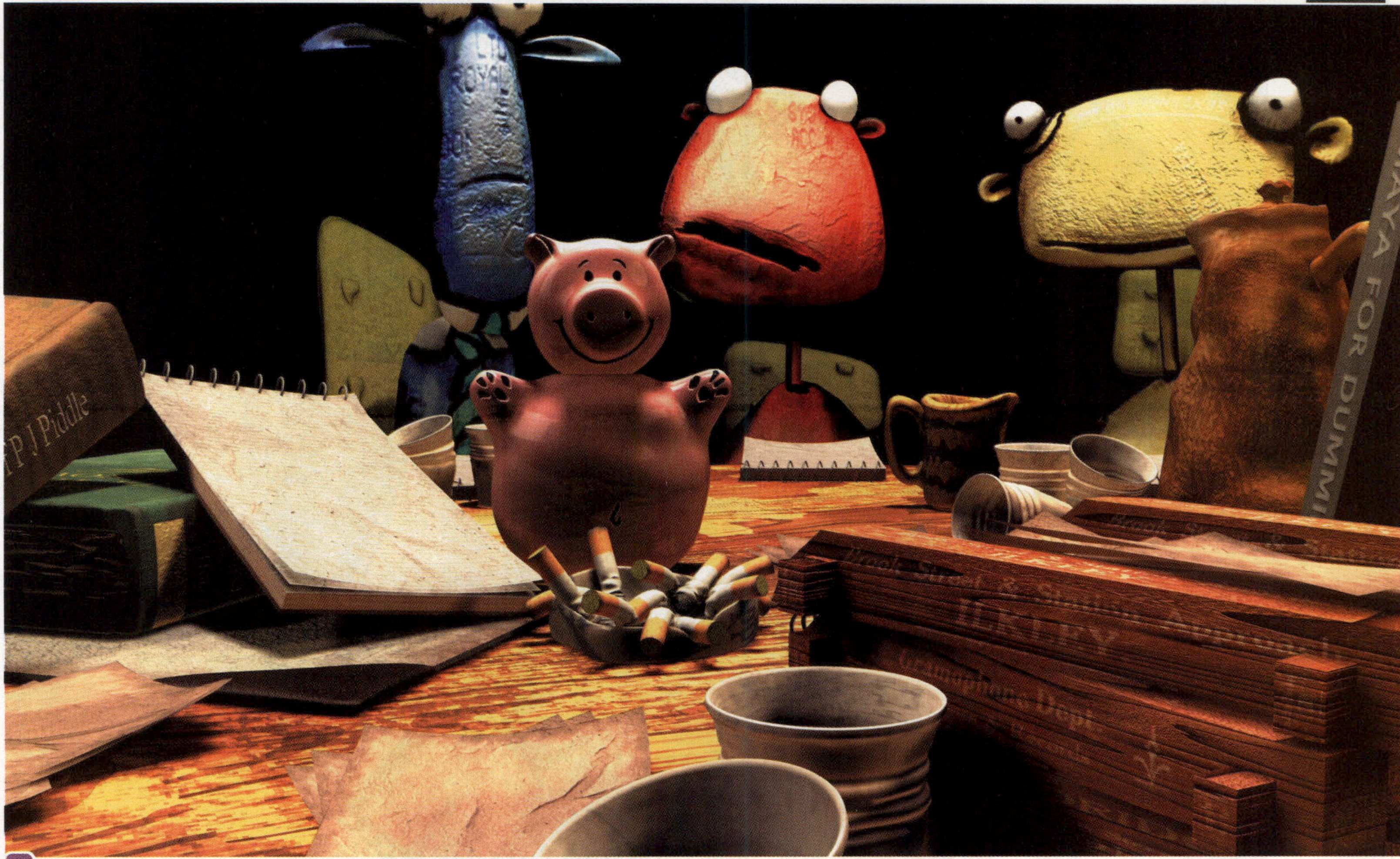
Byles is also currently reviewing the software set-up. "At the moment we're using *Maya*'s renderer, but we're looking at *Renderman* right now. *LightWave* is another possible tool, for modelling and rendering, using its intrinsic caustics and radiosity. I'm loathe to criticise *Maya*, but I'm very aware that we shouldn't stand still."

Long term there are even plans to develop Aardman's own proprietary software, developed in conjunction with an outside body. Although obviously not keen to reveal too much, he does say that it won't use traditional polygon or NURBs based modelling. "The modelling system we have in mind is completely different to the current paradigm. We're still considering who to partner up with. We need people cleverer than us to work out the mathematics," he laughs.

"Off-the-shelf stuff is very convenient, and of course you don't need to invest, all the legwork has been done. But a lot of off-the-shelf software has a lot stuff that just never gets touched. One of the arguments for developing our own software is to make it more specific. For example, we don't really need dynamics, or any of the fancier stuff. We don't even use Inverse Kinematics very much, preferring to use Forward Kinematics to animate in a more traditional way. One of the arguments for developing our own software is to make it more specific. You can get benefits in terms of speed and interaction by losing some of the bells and whistles."

Such investment suggests a serious commitment to CG, and indeed Byles' ultimate aim is for the CG division to become a UK rival to the likes of Pixar and PDI, working on its own full-length CG movies. "It's going to take a little time to grow to the point where we're able to do that, but that's certainly what I want to see happening."

Feature by Mark Ramshaw **[e]** markramshaw@email.com



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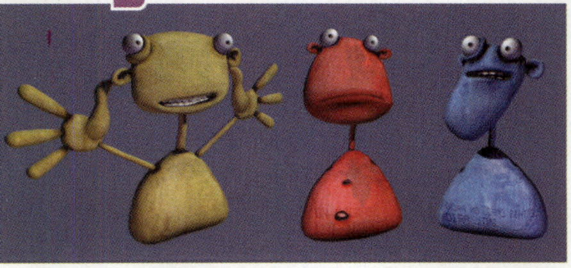
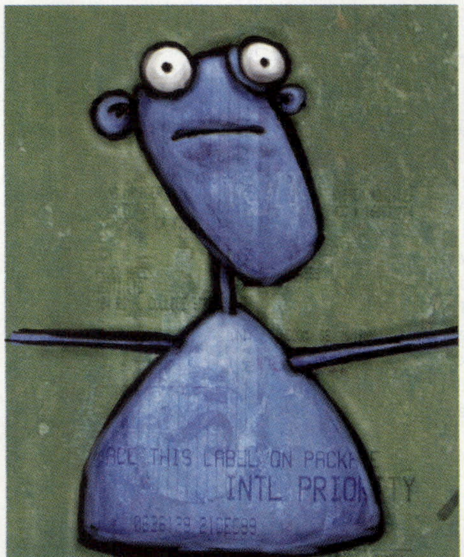




1. Aardman's aim here was to produce a character mouse with naturalistic fur. *Maya* fur and paint effects were used to achieve the desired result, bringing into play various mapping techniques for colour and baldness and also utilising the Fur Dynamic Chain Attractors for movement.

2. *Victorian Children* is a two minute CG film made in *Maya*, currently in progress and features Dickie and his sister Fanny Ella. Though privileged, theirs is a world of boredom and vulnerability. Aardman is also working on a *Flash* version for a possible Internet series.

3. Maquettes sculpted by traditional model makers are used by Aardman's CG model makers as 3D reference. Here we can also see the final textured sheep heads: the next step is to sculpt the blend shapes, which may require a few as five or as many as 40. These are used in conjunction with facial bones for lip synching and subtle facial expressions.

4. Aaardman's CGI department is currently making a short lip-synch piece which it hopes will have a a traditional model animation feel. The story is about the difficulties of coming up with ideas when a deadline is looming.

CG animation the Aardman way

Will Byles explains what makes Aardman's CG work special: "There's a general feeling that CGI is a slightly unpleasant, clinical shiny tool – that it's a bit geeky with computery connotations. We avoid that shiny, glossy type of CG. Instead of creating something that looks obviously CG, we're using it as a means of getting animation onto the screen: a means to an end. What also makes us different is that the ethos here is very much about film rather than video. We've got traditional film and animation backgrounds, and so are always after that filmic feel. It's an extension of the way the whole company works. For example, when we shoot a commercial, we're one of the few companies that gets the rushes back on film rather than tape. It's about getting back to the core of the work, rather than simply working at a surface level."

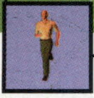


Illustration: Christian Darkin

Animation in After Effects

Christian Darkin shows how to create the illusion of rapid motion using static elements

After Effects is probably the most popular tool on the market for 2D and 3D animators and effects designers. Its speed and flexibility make it ideal for all kinds of animation and compositing jobs.

Version 5 has just hit the shops, and features a suite of new tools. Not least of these is the ability to work with 2D images in 3D space. The elements of your animations are organised in a much more sophisticated way – one which mirrors the real world more closely than previous versions.

In this tutorial, we're applying various *After Effects* tools to create animated effects. One of the most difficult aspects of these jobs is the fact that we're going for realism. Our first challenge is to make the appearance of rapid motion from a selection of essentially static elements. All the files you need are on the cover CD along with atmosphere.aep, the *AE* file we're creating, and atmosphere.mov – the final version. ➤

Expertise provided by Christian Darkin
[e] christian@darkin.demon.co.uk

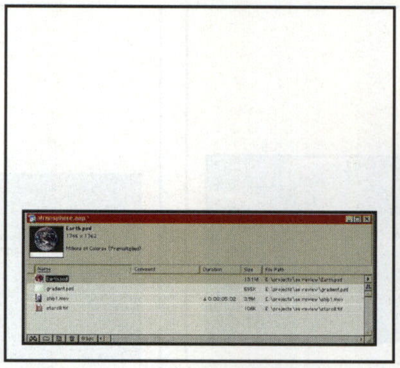
Files are on the CD in the **Dual\tutorial \After Effects** folder. *After Effects 5D* will be available in the UK in mid-April. For details, **[w]** www.adobe.co.uk **[e]** ukpr@adobe.com

Part 1: Static to animation

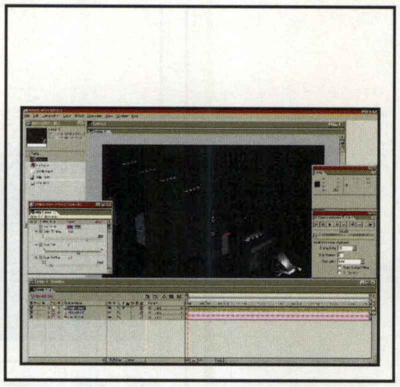
We'll start by animating images of a starry background, a planet, and a spaceship crashing through the atmosphere...

Display quality

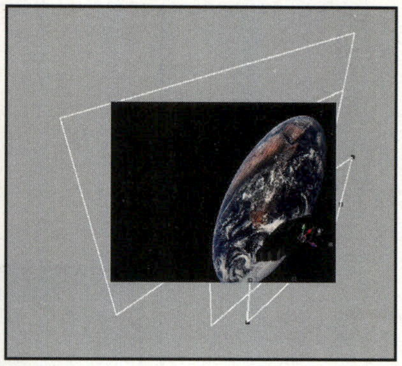
By now, the composition has become quite complex, and drawing it out will take some time. Use the controls on the Monitor window to reduce its Display Quality and updating will be quicker.



1 Import your footage. We've already got the basic elements of the shot – the stars, the planet, the spaceship, and the Glowing gradient we're using for the atmospheric effect. The ship itself has been rendered in *3ds max*. The animation simply shows it beginning to glow as it enters the atmosphere.



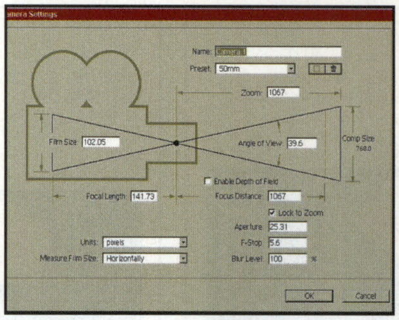
2 Creating a new composition, choose 720x576 as the size, and five seconds as the length. Then drag and drop ship1.mov, earth.psd, and finally stars8.tif on to the timeline. Right-click on the ship layer, and add a Colour Key effect to make the blue background transparent.



3 Check the 3D box for all the layers to make your composition 3D, then switch to Custom View 1 in the Monitor window. This gives you a different angle on your shot, and enables you to drag your elements into position – the spaceship at the front, the earth layer in the middle, and the stars at the back.

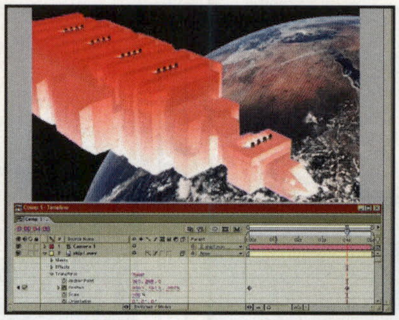
2D layer

We're leaving the gradient as a 2D layer. This means we don't need to worry about positioning it in 3D space. What's in front of and behind it depends on its position in the timeline stack.

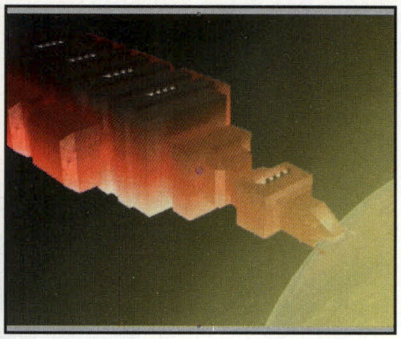


Preset: 50mm
Zoom: 1067
Film Size: 102.05
Angle of View: 39.6
Comp Size 768.0
☐ Enable Depth of Field
Focal Length: 141.73
Focus Distance: 1067
☑ Lock to Zoom
Aperture: 25.31
F-Stop: 5.6
Blur Level: 100 %
Units: pixels
Measure Film Size: Horizontally

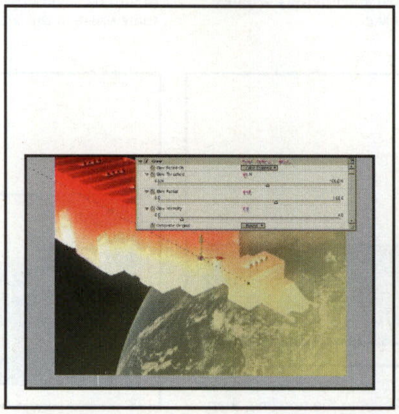
4 Switching back to Active Camera view, re-arrange the images so that just the edge of the planet, and the top-left part of the star background is in shot. Right-clicking in the timeline, create a new camera (accepting the default camera) then parent it to the ship layer using the dropdown list in the timeline.



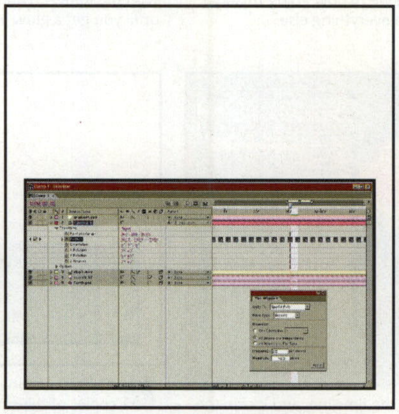
5 Now, we need to create the animation. Open the ship layer on the timeline to reveal the Transform, Position track. Click the stopwatch next to the label to make the position animatable. At the first frame, drag on the Monitor window so the earth is out of shot. At the final frame, move the ship past the earth.



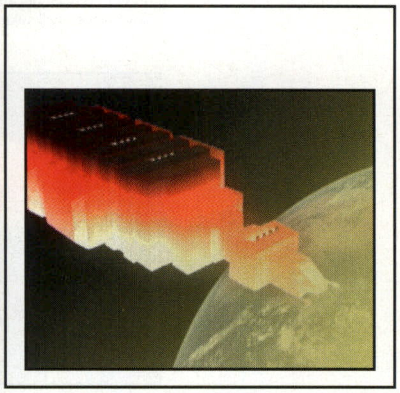
6 This creates two keyframes, and that's all we need to animate our scene. All that remains is to drop the Gradient image on to the timeline to give the whole thing an atmospheric glow. Using the RAM Preview Option in the Composition menu, you can see exactly how your shot will work.



7 A little fine-tuning will give your shot some more strength. We'll add a Glow effect to the ship layer to increase the effect of the ship heating up as it enters the atmosphere. In addition, turn on Motion blur for the stars layer.



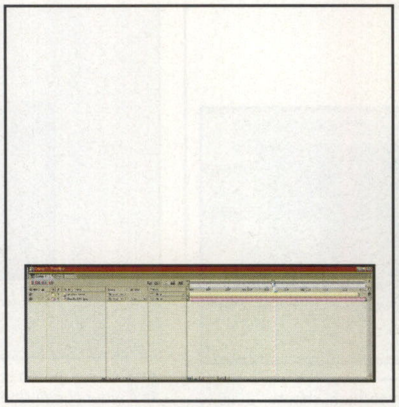
8 Finally, select the Camera Position track. Set up keyframes at the beginning and end of the animation then bring up the 'Wiggler menu'. This automatically creates random keyframes, making your shot appear to judder.



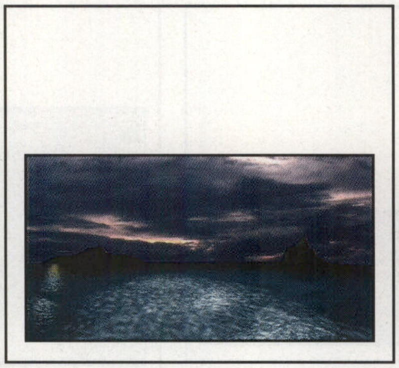
9 The easiest way to output your work is with the Export item on the File menu. This gives you a choice of output formats. If you want more control, you'll need to use Make Movie on the Composition menu. Here, you can choose which frames to export, and at what resolution. ➤

Part 2: Adding realism

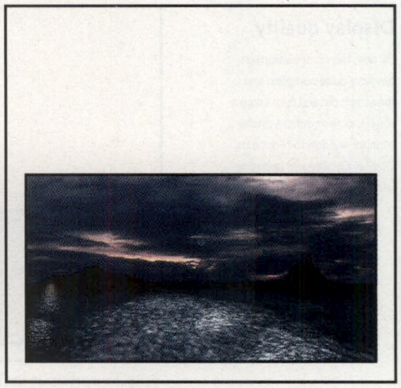
This shot of the ocean only lasts about two seconds, but we need mattes, reflections, and several effects to make it work



1 This shot consists of four elements. Import the following files: flyby.mov (the ship itself), water.mov (the effect the ship has on the sea), duskcld1.jpg (the sky image) and smoke.mov (the smoke billowing from the ship).



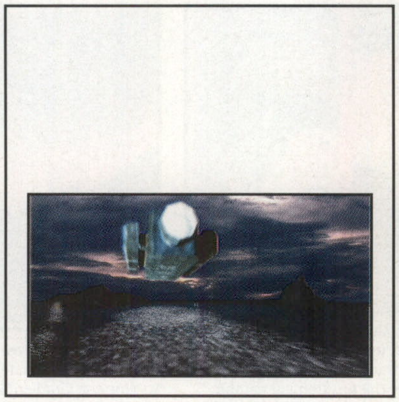
2 Create a composition three seconds in length and with dimensions 720x389 for a cinematic-shaped screen, and drop in the water image with the sky behind it. Now use a Colour key on the water to remove its background, and drag, and resize both images to get something that looks roughly like the shot above.



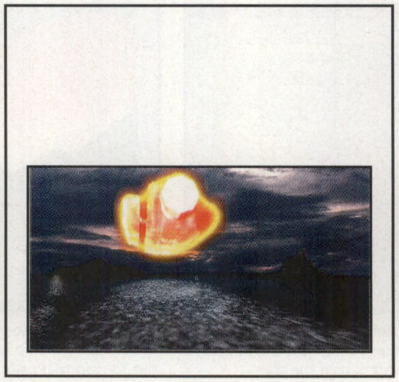
3 Problems with the Colour Balance are immediately apparent – the two elements don't match. Drop a Colour Balance filter on to the water layer, and reduce the level of green in it, then use a Hue and Saturation filter to take the overall colour level down a little.

The flip side

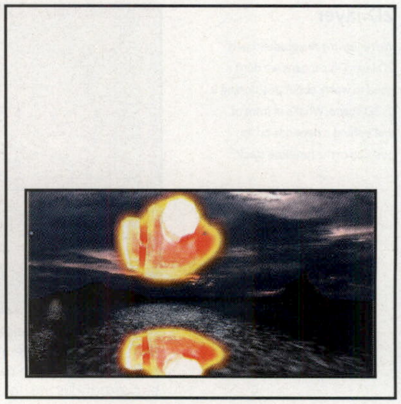
The handles on the image let you scale it vertically, or horizontally. We're using them to flip the entire image over.



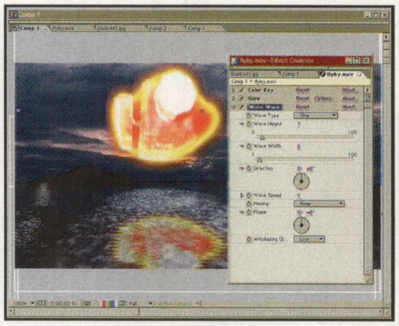
4 Now drop the ship in, and use a Colour key to superimpose it. You may need to play around with the Edge Thin, Tolerance, and Feather settings to get the best key. The colour isn't right again, but this isn't crucial because we're now going to add a Glow, which will swamp everything else.



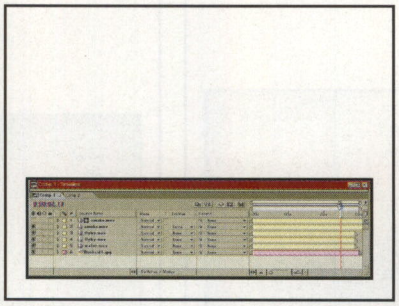
5 Drop in the Glow filter from the Stylise menu. Set the effect to be based on the Alpha Channel so the glow surrounds the model, then set the A and B colours to yellow and red, and set the Glow Colours to A and B colours. Now play around with the Radius, Threshold and Intensity settings until you get a glow you like.



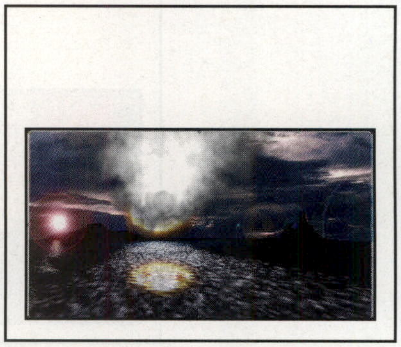
6 Next our glowing ship needs a reflection. Select the ship layer, then use the Edit menu to duplicate it. In the Monitor window, grab the middle handle at the top of the new layer, and pull it down to turn the layer upside down. Place the reflection somewhere in the sea beneath the ship.



7 Open the layer on the timeline, and locate the Opacity Control in the Transform section. Pull this down to about 56 per cent, then add a Wave filter to the layer. Give this effect a length of 5 and a direction of 0 degrees so the reflection is distorted slightly as if by the water.



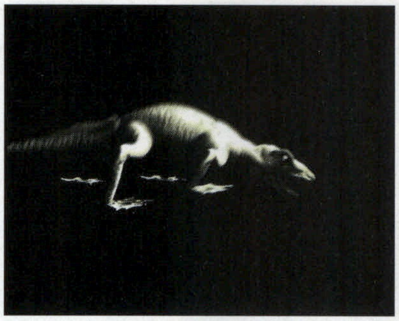
8 All that remains is to add the smoke. Drop two copies of the smoke on to the timeline, then use a filter to increase the Brightness and Contrast of the top one to about 60 per cent. Now click the Modes button at the very bottom of the timeline, and use the button which appears to set the bottom smoke layer to use the top one as a track matte.



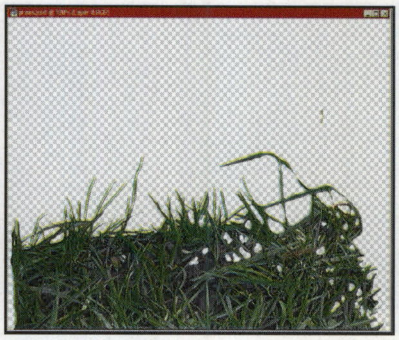
9 The result is smoke billowing from the back of the ship. In the video on the disk, we've gone a little further, creating a reflection of the smoke, and a lens flare for the setting sun. Take a look at atmosphere.mov on the cover CD.

Part 3: Compositing scenes

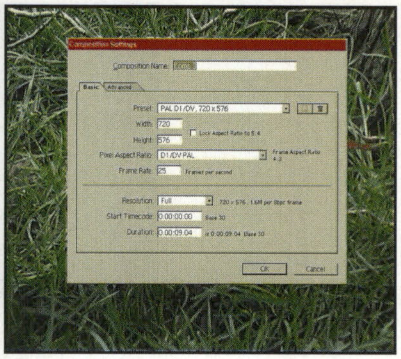
Placing an animated creature against a background shot on video means we have to composite the two scenes seamlessly into one shot



1 Import the elements of the shot. Our lizard has been animated and rendered in *3ds max*. There are two files associated with it – an image file – lizrd.mov, and a matte file – lizrd_alpha.mov. We purposely haven't taken too much effort over the creature's feet because they'll be covered in the finished shot.



2 The shot video footage is split into three parts; a background still – grass.bmp: a movie – grass.mov, and a foreground shot – grass.psd. The latter is an image created in *Photoshop*. We've cut out a complex mask so we can see the lizard through the grass blades.



Composition Settings

Basic | Advanced

Preset: PAL D1/DV, 720 x 576

Width: 720

Height: 576

☐ Lock Aspect Ratio to 5:4

Pixel Aspect Ratio: D1/DV PAL

Frame Aspect Ratio 4:3

Frame Rate: 25 Frames per second

Resolution: Full 720 x 576, 1.6M per 8bpc frame

Start Timecode: 0:00:00:00 Base 30

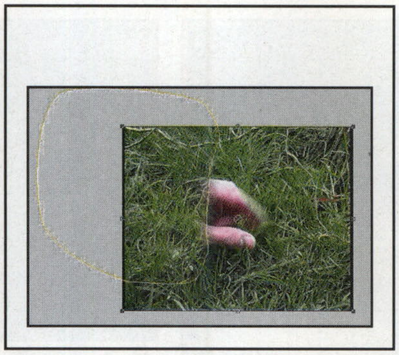
Duration: 0:00:09:04 is 0:00:09:04 Base 30

3 Now that the files have been imported into *After Effects*, we can start work. Create a composition, 720x576 in size and nine seconds in length. Drag the grass.mov footage on to the timeline, and drop grass.bmp underneath it.

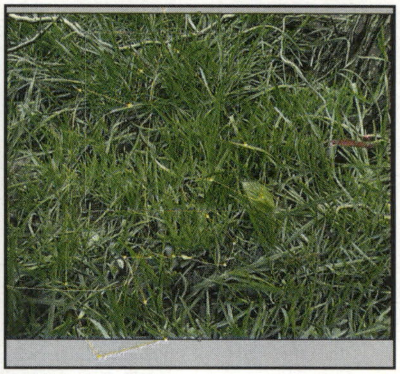
Selecting layers

The mask will work on whichever layer is selected, so make sure you've got grass.mov and not grass.bmp selected.

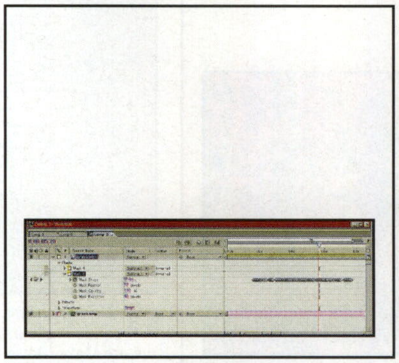
4 We've used a hand to create our creature's interaction with the real world as it picks a leaf from the ground and throws it around. We need to create an animated mask to remove the hand (letting our background image, grass.bmp become visible beneath it), but leaving the leaf in place.



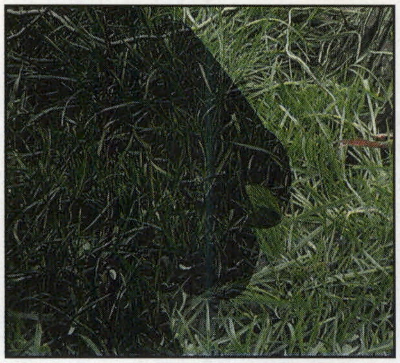
5 Click on the Pen icon and draw a mask directly on to the composition window. We're using two. The first is a simple shape used to mask the left-hand side of the screen. This isn't animated, but right-click on it and set a Feather value of 100 to blend it seamlessly with the background, and set it to Subtract mode so it becomes a hole through to the Still Image layer.



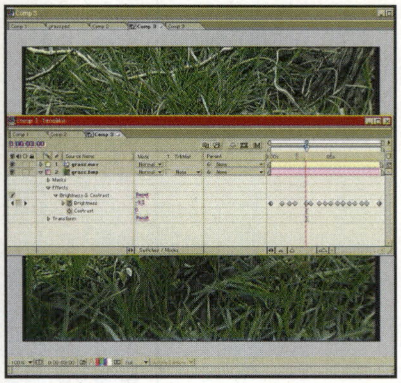
6 This removes most of the hand, but we still need another mask to take out the fingers. Move to a point on the timeline where the fingers are visible, and draw a mask quite closely around them. On the timeline, open up the mask, and click the stopwatch next to the Mask Shape track. This lets us animate the mask.



7 Now for the painstaking bit. Step through the entire animation, one frame at a time, correcting the position of the mask to follow the motion of the hand. This sets up animation frames throughout the clip, so the mask always covers the hand. (Luckily, we only need to be very accurate around the leaf itself).



8 RAM previewing this animation, we realise the result isn't as good as it could have been. Changes in sunlight over the course of the clip make our mask quite obvious. There are two things we can do to get round this – first, increase the Feathering, and use Mask Expansion to blur the edges of the matte.



9 Second, right-click on the still image, and add a Brightness and Contrast filter. Animate this, placing keyframes roughly every half a second, and matching, by eye, the brightness of the background to the foreground. The result isn't perfect, but it'll have to do. ➤

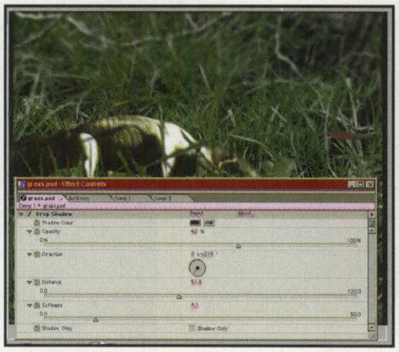
10 Now, at last we can start compositing. Create a new composition, and drop the first one onto its timeline. The background we've created can be used in the same way as any video clip. Our first job is to give it some depth of field. Duplicate the layer, then mask off just the top fifth. Then give the mask a massive Feather value (300) and apply a Gaussian Blur filter to make the shot blur at the top.

11 Place the layer grass.psd in the foreground, and blur that a little too. You'll find that your flat-looking shot begins to have some depth. Now place the two lizard movies on to the timeline between the foreground and the background, making sure that lizrd_alpha.mov is on top.

12 Click the Modes switch at the bottom of the timeline, and pick lizrd_alpha.mov as the luma matte of lizrd.mov in the column which appears. The lizard should now appear in situ (if you want to change its position, remember to select the matte and the lizard itself, or use parenting to connect them together so they don't go out of sync).

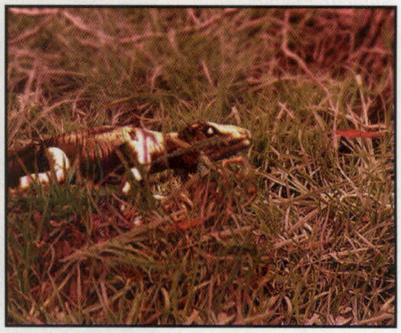
Drop shadows

The drop shadow isn't perfect – it will also cast a shadow on the grass layer behind the lizard. In this case, that doesn't matter because the image behind is tangled enough to hide the shadow. If it had been visible, it would have shown up the fact that we're using a flat photo of the landscape behind rather than a real landscape.

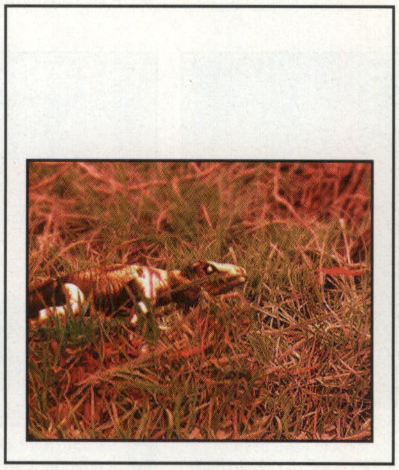


13 To give some more realism, select the foreground grass, and add a Drop Shadow effect. This makes the blades of grass in front of the creature cast a shadow on its body. Play around with the settings to get a good result.

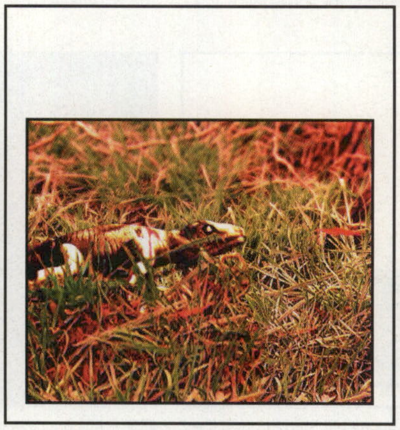
14 Our shot is okay. The grass is there, the lizard is there, and there's some depth, but somehow it doesn't work – it's bland. Everything's green, and there's no life in the image. The problem is colour: we need to do some image enhancement. This will help to bind all the elements in our effect together.



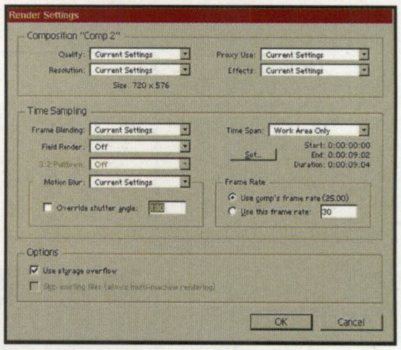
15 Create a new composition, and drag your last composition into it. Now apply a Colour Balance filter. In order to counterpoint the green in the shot, we're going to emphasise the red. Bring up the red balance in the shadows and highlights, but not in the mid-tones.



16 Instantly, it's a warmer day. The grass looks dry and a little more interesting, but there's still no strength to it. Bring in a Hue/Saturation filter, and bump up the Saturation of the reds.



17 Finally, add a Levels filter. Play around with the sliders for the RGB and the red and green components separately from the image to increase the contrast. This deepens the shadows, and strengthens the colours, making the shot look as though it was taken on a hot sunny day.



Render Settings

Composition "Comp 2"

Quality: Current Settings
Proxy Use: Current Settings
Resolution: Current Settings
Effects: Current Settings
Size: 720 x 576

Time Sampling

Frame Blending: Current Settings
Field Render: Off
3:2 Pulldown: Off
Motion Blur: Current Settings
☐ Override shutter angle:
Time Span: Work Area Only
Start: 0:00:00:00
End: 0:00:09:02
Duration: 0:00:09:04
Frame Rate
● Use comp's frame rate (25.00)
○ Use this frame rate: 30

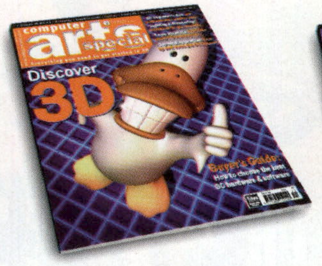
Options

☑ Use storage overflow

18 We want a little more control over our rendering than the Export function allows, so we use Make Movie on the Composition menu. Here, you can elect to render whichever section of your scene you want, and at whatever resolution you want. You can also choose your Compression Codec, and whether fields will be rendered. This is ideal for our project because it's destined for DV output. Take a look at lizard.mov on the disk for the final animation.

Back issues

All back issues cost £6. Postage free in UK. Add £1 per issue for European orders. Add £3 per issue for the rest of the world.



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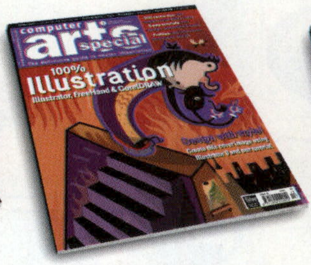
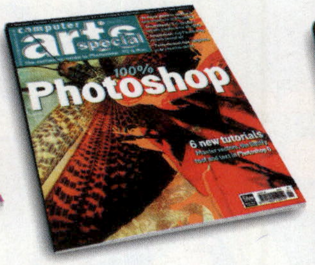
CD Three complete 3D programs: *Pixel 3D, Blender 2* and *Strata 3D* and all the files you'll need to do the tutorials.



Computer Arts Vector Illustration Special – **COSB0015**
200 Vector tips covering all aspects of *CorelDRAW 10, FreeHand 9* and *Illustrator 9* plus a comprehensive guide to their interfaces, with shortcuts to make life easier. Create the cover image using *Illustrator* and our tutorial – and find out how to combine *Illustrator* and *Photoshop*. Plus profiles of leading artists and everything you need to know about typography.
CD Demos of *Illustrator 9, FreeHand 9* and *Fontographer* plus *Photoshop 5*, animations, plug-ins, tutorial files and more.



Computer Arts Photoshop Special – **COSB0016**
Six *PS6* tutorials on vectors, shapes and the Liquify tool (and more) to familiarise you with the latest upgrade, plus in-depth guides to the new interface and the best plug-ins. On the Web side, discover how the bundled *ImageReady 3.0* can transform your graphics, and, if you're looking for inspiration, more than 30 top artists spill the beans in our special feature.
CD 27 *Photoshop* plug-ins including *eyecandy 4000, xenofex* and *Flaming Pear icons* plus demos of *Illustrator 9* and *Photoshop 5.5.*

Computer Arts Web Techniques Special – **COSB0017**
33 pages of new tutorials including 3D effects in *Flash 4*, crossbrowser code in Netscape 6, connecting a database to an existing page using *Dreamweaver UltraDev 4* and the latest features in *Fireworks 4*. We also take a look at the future of Web design, the secrets of great style sheets and come up with 30 tips that you'll find invaluable. Plus add-ons, resources and profiles.
CD Demos of *Dreamweaver 4 & UltraDev, Flash 5, Fireworks 4* and *Netscape 6* as well as more than 30 of the best add-ons.

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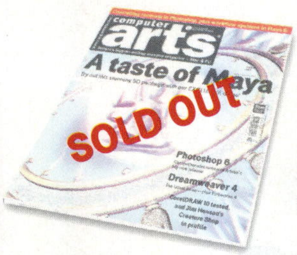
CD Demos of *Director 8, Dreamweaver/UltraDev 4* and *LiveMotion*, plus the *Java Integration Kit* and resources.



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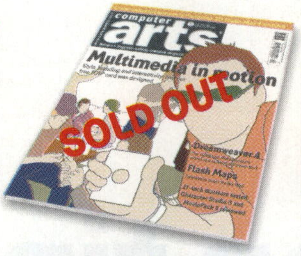
CD Exclusive *Maya* demo.



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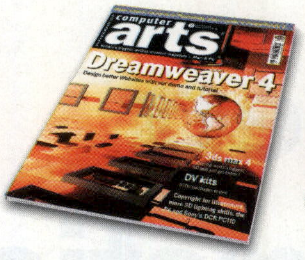

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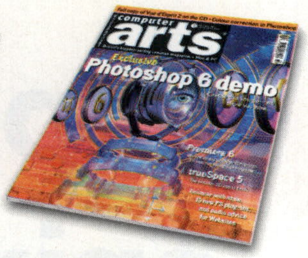
CD *UltraDev 4, Fireworks 4, Maya Paint Effects*, 151 *PS6* brushes.



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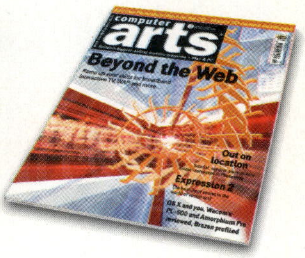
CD Plus 10 *PS* interfaces, and *Vue d'Esprit 2* – the full product



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Expert animation tips

We've gathered the most formative tips and advice from some of the best animators working today

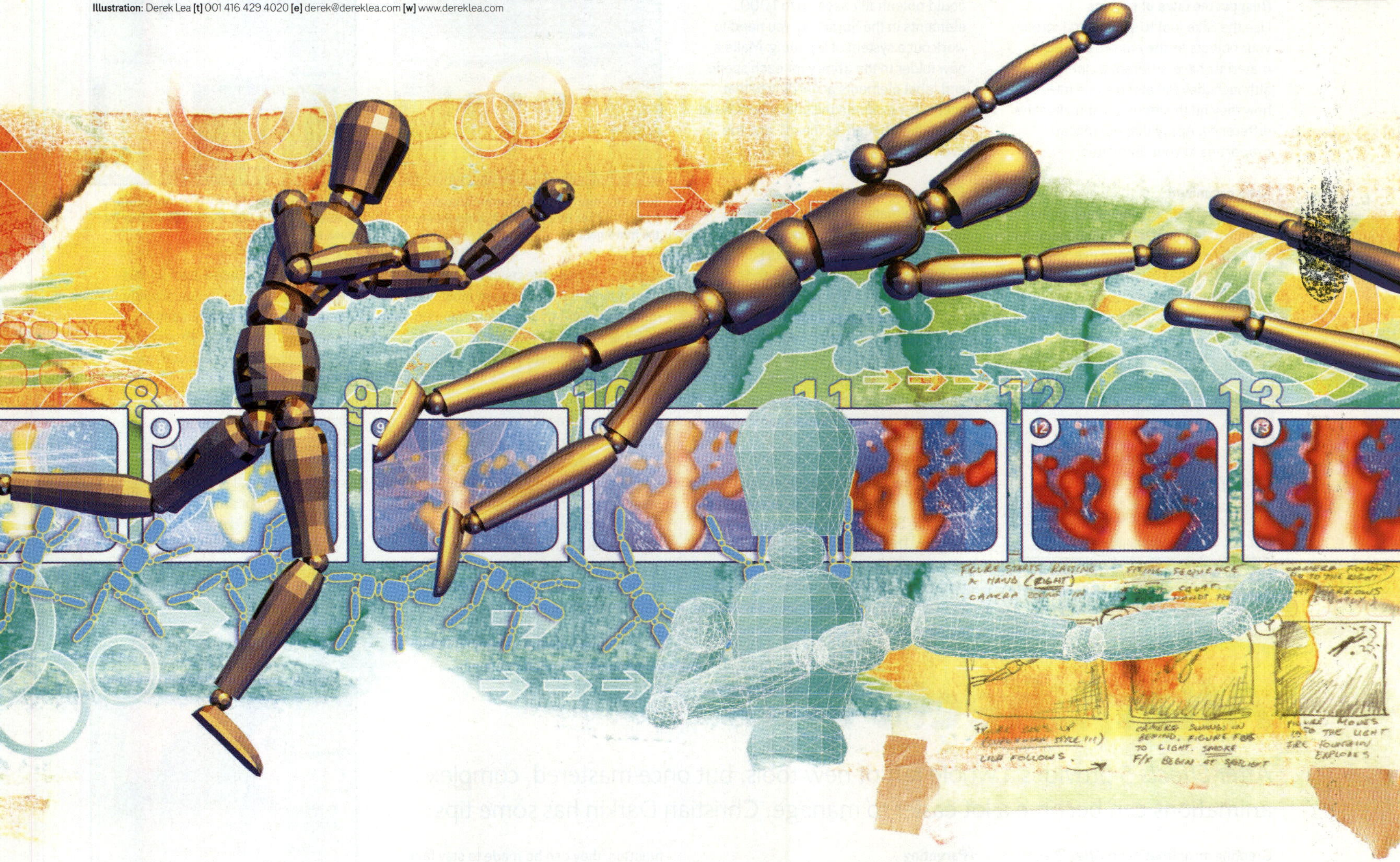
Elsewhere in this issue you'll have seen how to create animations from scratch and how to achieve professional results with our cover demo software. In this article, some of our favourite writers contribute the tried and tested techniques that they use on a daily basis.

We've gathered together some of the top names in 2D and 3D animation and asked them for their top power tips with their favourite software. Over the next four pages you can find out how to get the best out of everything from *Flash* to *LightWave*.

Learn how to avoid the most commonly-made mistakes, rediscover some underused functions and get to grips with the shortcuts that really will speed up your workflow. Need to know how to work with motion tween, or how to use polygon Selection Sets? We'll tell you that and much more – read on and become an animation power user…

Expertise provided by: Andy Wyatt [e] AndyWyatt@compuserve.com: Christian Darkin [e] christian@darkin.demon.co.uk: Steve Townrow [e] steve@kanku.freeserve.co.uk/animator@madasafish.com: Steve Holmes [e] steve@outlawfx.com and Bill Fleming [e] CHAOS3D@aol.com.

Illustration: Derek Lea **[t]** 001 416 429 4020 **[e]** derek@dereklea.com **[w]** www.dereklea.com


8
9
10
11
12
13
FIGURE STARTS RAISING A HAND (RIGHT)
- CAMERA ZOOMS IN
FLYING SEQUENCE
CAMERA FOLLOWS TO THE RIGHT
LIGHT FOLLOWS.
CAMERA SWINGS IN BEHIND, FIGURE FLIES TO LIGHT. SMOKE F/X BEGIN AT SPOTLIGHT
FIGURE MOVES INTO THE LIGHT FIRE FOUNTAIN EXPLODES

Flash animation tips

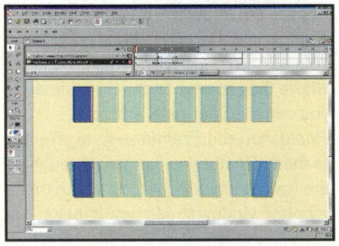
There are plenty of tips to be learned from the traditional animator's craft. Andy Wyatt suggests a few to help add that extra little bit to your animation

Working with the motion tween
Occasionally you might wish there was no such thing as a motion tween! Although the tween function can be extremely useful, don't take it for granted. The tween function has the habit of making the movement wooden and mechanical. Add a little anticipation before a movement and a slight overlap and recoil at the end of the move. This will give your animation more bounce and life. Learn to combine the tween function with some manual frame by frame animation. Don't tween everything for the sake of it. Sometimes two or three keyframes are sufficient to keep the animation snappy. Using keyframes doesn't increase the file size.

Easing in and out
The Ease function within the motion tween is a very overlooked utility. The amount of Ease (deceleration and acceleration) can make a world of difference to your animation. By adding extra keyframes, you can change the easing throughout the same movement, creating far more subtlety.

Don't imitate, innovate
So much *Flash* Animation out there looks the same. Although the *Flash* drawing tools are great, they have the tendency to make everyone's drawing look the same, partly because of the shape smoothing. Scan in paper drawings, or try using a graphics tablet and pen with the shape smoothing switched off.

Don't over-animate
The tendency to make a scene too busy is a common mistake. Keep the animation focused, and guide the viewer's eyes to where you want them to look. Not only does this make the animation more attractive to watch, it keeps the file size small.


A skilful combination of the motion tween with manual keyframes will create a more convincing animation. This does not increase file size.

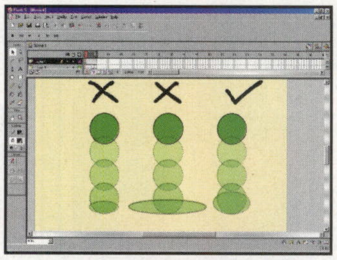
Onion skinning
Onion skinning is to the *Flash* Animator what a light box is to a 2D animator. Learn to use the skins to help you control movement, especially in conjunction with the Easing utility. In time and with a bit of practice, a good use of onion skins will improve your timing, and result in a more fluid animation. ➤

Respect the laws of physics

Use the Size tool to squash and stretch your objects as they move. Different materials have different properties, although they fall at the same rate. It's how they hit the ground that makes the difference. Apply these physical properties to your animation.

Keep organised

If you're making a piece of animation that is quite involved, it is of paramount importance that you keep everything organised in the library, and use a new scene for each new sequence. Even an animation that only lasts for a minute could potentially have up to 1,000 elements in the library, so you need to work out a system of labelling. Make a new folder in the library for each scene and label elements according to that scene. For example the character's head would be labelled 'sc1head1' and the eyes 'sc1eye1', 'sc1eye2' and so on.



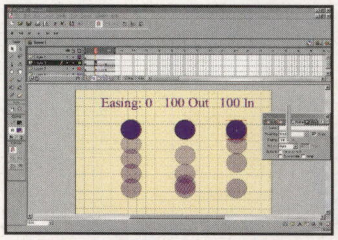
Extra inertia and energy can be achieved by distorting the objects. The overall volume of a distorted shape should remain constant.

Colour reference movie

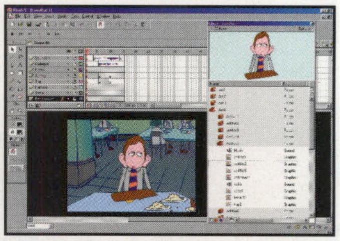
If your animation contains several scenes of the same character, then before you start, make a *Flash* File with all your main characters and designs in and call it a reference movie. Then when you come to colour a particular character or object, open the reference movie as a library, and take out the elements you require. This ensures there are no annoying colour discrepancies in the animation.

Using sound

If you use a lot of sound effects and dialogue in your animation, always keep the Sound panel Properties on Stream. This means sound will take priority on playback, and skip a few frames of visuals if necessary to keep the animation running at the correct speed. This only affects machines with slower processors, because most modern machines will easily keep up with the required refresh rate of even the most complicated *Flash* movie.



To avoid a mechanical appearance, controlled use of the Ease properties will add subtlety to the movement.



A well-maintained library is essential in any animation production. Make a new folder for each scene.

Flash for TV

The Internet is a great way to get your work seen, but if you ever want your *Flash* animation to be seen on television you must work at a suitable screen ratio size of 3:4, for example: 300x400 pixels, or 600x800.

You must also ensure that the crucial action doesn't take place right at the edge of the screen, because television has the annoying habit of cropping the image around the edge. Luckily this month's cover CD includes a handy TV cut-off guide. Your frame rate should ideally be 25 fps [frames per second] to be compatible with most video equipment.

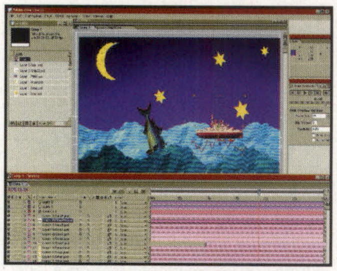
Observe

Finally; make a habit of watching people move: how certain objects react when they hit the floor: how uncle Stan hits the floor after too much whisky: how a cat creeps up on a bird: how people walk. Watch silent movies and watch animation. All these everyday observations can be applied to the simplest animation.

After Effects tips

After Effects 5 provides a whole raft of new tools, but once mastered, complex animations can become a lot easier to manage. Christian Darkin has some tips

Creating an animation in *After Effects*, is a matter of completing the following basic process – video clips and still images are imported into the Project window and a Composition is created. Your elements are then dragged into it where they appear on the timeline and you can alter, animate, and add *Photoshop* and *Première*-style effects to them. Finally, you can step through the frames of your composition in the monitor window to see how it looks.



After Effects contains a lot of windows, and can look imposing. However, you'll soon start to find your way around.

Parenting

You can now create hierarchies among your *After Effects* layers. By using the Parent button, you can make any object the parent of any other object. Then, if you move or rotate the parent of an object, that object moves with it.

The practical upshot of this is that you can create very useful relationships between layers. Say you've built a figure in *Photoshop* where the body, arms, forearms and hands are all on separate layers. When you import this into *After Effects*, and set up the correct parenting, you can rotate the various joints of the arm, and the figure will stay together (as long as you've placed your pivot points correctly).

3D layers

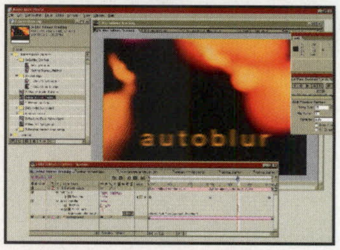
New in *After Effects 5* is the ability to use 3D layers. By checking the 3D box next to a layer, you can move it around in the x, y and z directions, and place cameras and lights wherever you wish. Objects can be made to cast shadows on each other, or, using the Auto-orient function, they can be made to stay face on to the camera however the camera moves, which gives the illusion of 3D even though the object itself is just a flat image.

Not all layers have to be 3D, and you can combine 2D and 3D layers as you wish – for example, it's easy to overlay 2D text onto a 3D composition.

Workflow

At the bottom of the monitor window are two dropdown lists – one controls the size of your monitor screen, the other controls the rendering quality shown there. Once your compositions start getting complicated (in other words, they include more than three or four layers or effects) you'll probably need to drop the image size and quality to improve the speed of your screen updates.

Also, try using the solo switch at the left of each item on the timeline – this lets you turn on just the layer you're working on, so you'll be able to work a lot quicker.



Expressions are a powerful way of linking one animated function to another – creating relationships between objects which would otherwise require difficult keyframing.

Expressions

Expressions are the new way to create interaction between animated objects. With them, you can make any aspect of one layer control any aspect of another layer. If you want to be even more sophisticated, you can use the JavaScripting language to write mini-programs which control the animation of your objects.

New filters

Several new Effects filters have been included in *After Effects 5*. Vegas is used for making animated light effects which surround and chase over the surface of your objects. Wave world creates a multitude of 3D wave effects. Caustics models the effect of light reflected through water to produce shimmering ripples which distort your images. And Card Dance provides a customisable set of transitions where images flip over to reveal other scenes.

Production bundle
After Effects comes in two varieties. The Standard Version and the more expensive Production Bundle. The latter features a range of extra filters such as Glow and Video paint and also includes Transparency and Matte tools, an effective set of Chromakey effects, and motion tracking. Motion tracking is the ability to trace the movement of an object over the course of a video shot, then apply that motion to another layer. It enables you to place effects into moving camera shots or moving objects.

Feathering masks
It's almost impossible to draw a pixel perfect mask to separate objects from their background– especially if they're moving. You can animate the shape of a mask, but that's rarely enough to produce a good result. The solution is to fudge it: use feathering to soften the edges of your matte, blurring slightly, and the eye will do the rest. If you're using the production bundle, try the 'inner-outer mask'. This uses keying to try to work out the best compromise between two masks on every frame.

Text
The Path text tool enables you to animate text to follow whatever shape you draw. You can apply effects to a text object in the same way as any other layer. However, it's often better to create your text in *Photoshop* or another package, then import it as an image.

The package offers several 'one click' solutions to common effects needs. Here we've created animated lightening with a single filter.

Cinema 4D tips

The excellent new HyperNURBS and Bones system in *Cinema 4D XL* is perfectly suited to character animation, but it can be a daunting area full of pitfalls for the beginner. Steve Townrow suggests some guidelines...

One cage, multiple parts
A useful technique is to use HN polygon cages which consist of multiple parts, but are joined as one object using the Connect tool. For example, if a character needs a belt, rather than extruding a row of polygons from the waist, use the Clone tool to make copies of the polygons and build a belt from those. This has the advantage of not altering the shape of the character's body and makes texturing easier.

Model in quads
For a smooth finish to a HyperNURBS model, use four-sided polygons rather than three-sided ones. This is because a three-sided polygon doesn't have uniform tension across its surface, but a four-sided one does. Also, try to keep the four points of each polygon in the same plane.

Editor settings
Model your character with enough detail in the polygon cage to appear smooth at an HN smoothing level of 2 unless you plan any close-ups. As HN smoothing is increased, the skin tightens, resulting a slightly smaller mesh so you should animate poses based on the final render smoothing not on your editor smoothing level.

Size matters
Deformation by bones of a detailed cage will slow even the fastest of machines. Simplicity is the key but this doesn't mean you have to compromise on detailed characters – you just need to learn where to put the detail.

Joints
Putting too much detail around elbows, shoulders, knees and groins may cause problems later when the bones deform the mesh. It is a trade-off between the level of detail needed to define the shape you want and how well it will deform. Start simple and add more detail after you are satisfied with the deformation.

Top bone Function
The top level bone will set the Function for all bones that are below it in the hierarchy. The Function of all other bones can be altered but to no effect. To have the bones grip the mesh and create sharp creases (as seen at elbows and knees), a Function of 1/r^8 or 1/r^10 should be used.

Restrict bones to large Selection Sets
Often, beginners feel they have to create polygon Selection Sets for every part of the model but one Selection Set for the whole leg or whole arm may be sufficient. The same Restriction Tag referencing this set can then be applied to every bone inside that part of the cage. Make sure every polygon is assigned to a Selection Set and every bone has a Restriction Tag.

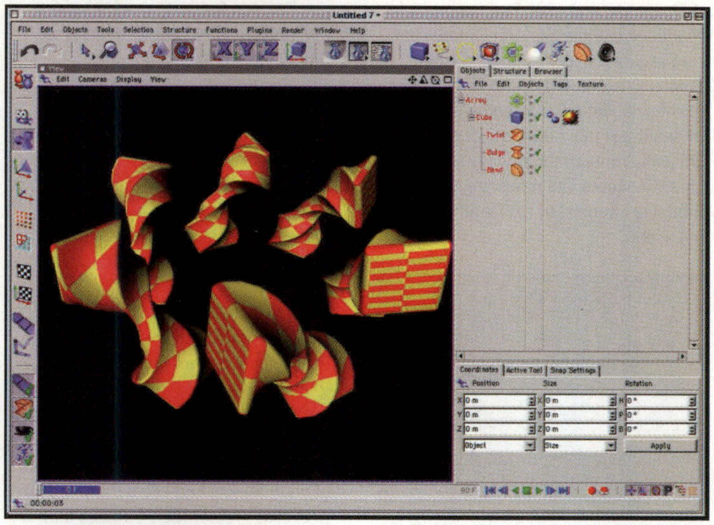
Use polygon Selection Sets
Vertex maps are fine when you need very precise control over how each point in the polygon cage is defined but they are time-consuming to set up and can have slower performance than polygon Selection Sets.

Shaper bones
If your model has parts that receive little influence from bones, you will see the cage deforming in ways you didn't intend. The temptation is to increase the strength of the bones but instead, put a few strategically placed bones in the void areas with the appropriate Restriction Tag. This will help the model keep its shape when deformed.

Not too many
Having said that, try to keep the number of bones to a minimum – remember the more you add, the more processor power is needed to calculate how a bone is affecting the points in your polygon cage. A good test for unnecessary bones is to put the model in extreme poses, then turn off each shaper. If the changes to the HN mesh are negligible, the chances are that bone is in the wrong place or isn't needed. It is an unnecessary overhead on system performance and should be removed.

Smooth blends
Using multiple entries in a Restriction Tag is useful for creating a smooth transition between areas. For example, at a shoulder, use a Restriction Tag on the upper arm bone that affects the arm polygons (in one set) and also the body (in another). This will create a smoother bend than having the upper arm just affect the arm selection set and a spine bone just affect a body selection.

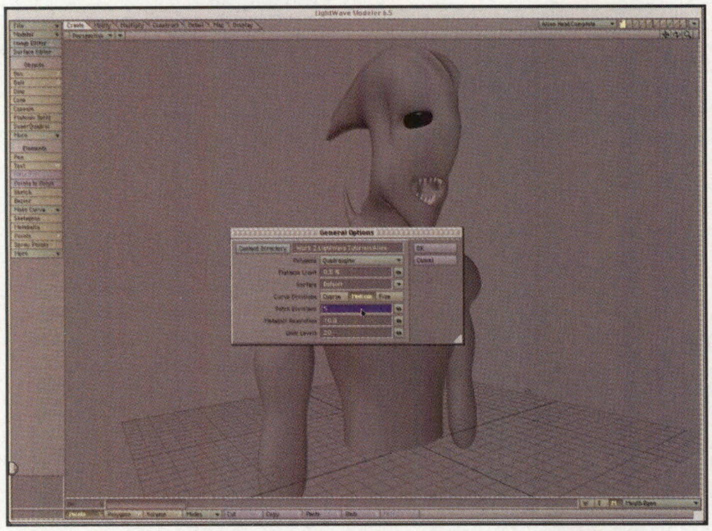
Restriction Tag limitation
In Restriction Tags, don't have a reference to a polygon Selection Set and Vertex map in the same tag – strange things will happen. Using a mixture within a model will work fine, just not within the same tag. ➤



***XL* encompasses modelling, animation, lighting, texturing and rendering all in one neat package.**

LightWave 3D 6.5 tips

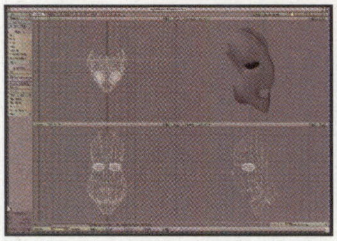
Version 6.5 offers great control over customised menus, tabs and keyboard shortcuts. Steve Holmes has some advice on setting up and working in Modeller



When working on Sub Patch models use the General Options (o) to change the Sub Patch Divisions.

Customise your menus
Use 6.5's great control over customised menus, tabs and keyboard shortcuts to speed up and simplify your work process. Go to Modeller>Interface and choose Edit Keyboard Shortcuts or Edit Menu Layout. Put the tools you will use the most in easy-to-find places, such as the Skelegon tool to the Create tab, as well as the Spray Points one. Shortcuts like F3 for Center 1D would help, as F2 is already assigned to Center All.

Sub Patch Divisions
When working on Sub Patch models in Modeller, use the General Options (o) on a regular basis to change the Sub Patch Divisions. Start with something like 4 or 5, but as your model increases in detail, set this down to 3 or even 2. This only represents what we see in our OpenGL views. The rendering of the model is affected by a different option in Layout.



Hiding unwanted polygons makes it easier to make subtle changes or selections.

Content Directory
Always, for every job, set the Content Directory to the right project folder, via General Options (o). This will ensure objects, scenes and images are saved and loaded correctly. This can cause major problems if it is not done, which can be hard to rectify. Silly really, because it's so easy to set up!

Polygon Selection mode
When working in one layer that has multiple objects, remember that when nothing is selected, everything is selected! To select individual objects, use Polygon Selection mode, select one polygon on a shape, and hit] to Select Connected.

Specularity
When working with Sub Patch models, set the surface attributes to have some Specularity. Even if the end result won't be shiny, it does help the smooth modelling process if highlights catch when polygons are bent and rotated.

Polygon Statistics
Use Polygon Statistics regularly. This little window helps with so much. Use it to make selections from polygons with certain surfaces applied. Use it to load Polygon Sets for editing. More importantly, use it to look at the status of your objects and see if there are any polygons greater than 4 or less than 3-sided – these cannot be Sub Patched.

Endomorphs
When making endomorphs, set up Point Selection Sets first for groups like jaws, eyebrows, nostrils, ears, cheeks. When each endomorph is worked on, these Selection Sets can easily be turned on via the Point Statistics palette.

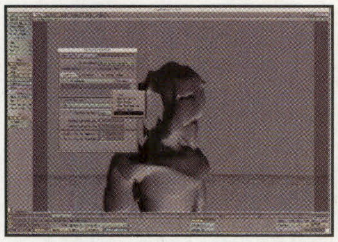
Hide and Unhide
Use Hide (-) and Unhide (\) to make your workflow easier. Intricate models, especially in Sub Patch, slow the previews down. Hiding unwanted polygons makes it much easier to make subtle changes and selections.

Tool shortcuts
Learn the basic Move, Rotate and Scale tool shortcuts from Modeller (t, y and H), as they are identical in Layout and make work faster not having to move between menus and tabs.

Content Directory
As in Modeller, make sure the Content Directory is set correctly. It's actually more important in here than Modeller: when you load a scene, it looks into your project folder for objects and images, nowhere else. If the Directory isn't set, it won't find them.

Navigation
Use the same Zoom, Scroll and Pan tools in Modeller and Layout for quick navigation (these tools work in every view, apart from the Camera view in Layout). Hold Option for Panning, Option-Ctrl/Command for Zooming, and Option-Shift for Scrolling in 2D.

Anti-aliasing
When first in a new scene, set the Camera's Anti-Aliasing to Low. This gives every render a smooth edge, helping compositing as well as texture previews.



Setting Subdivision Order to Last causes *LW* to render polygons after deformation.

Setting the lighting
The default scene lighting in Layout is appalling. Upon creating a new scene, go to the Lights Selection tool and hit 'p' to access the Properties palette. Set the Light Intensity to about 120 per cent. Then, click Global Illumination and set the Ambient Intensity to around 3-5 per cent. 25 per cent is way too high, and is the biggest culprit for nasty, basic, 3D-looking renders. Everything looks light and grey.

Shadow density
To control shadow density in Layout, use two lights. Set the first light as a Spotlight with shadows turned off in the Properties palette, and Brightness set to about 60 per cent. Duplicate the light, select the duplicate, reset its Position and Rotation values, then hit 'm' for its Motion Options, and parent it to the first light. This puts it in the same position and rotation. Now use the Properties palette on the new light to turn the shadows on to Shadow map. Set the Shadow map Size to 1,024, and the Fuziness to around 3. Now you have two light sources which add together to give 120 per cent, but shadows are only at 60 per cent from one of them.

Targetting the camera
Never Target a Camera to an object in the scene. This forces the Camera to focus on the object's Pivot Point, which may be moving and rotating, or not in the right part of the object to focus on. Before positioning the Camera, add a Null Object, call it Camera Target Null, and then use the Motion Options (m) on the Camera to Target the Null. Now, you only need to move the Camera to move and rotate it. To animate the view, add Position keyframes to the Null.

Deformed polygons
When using Bones, Effectors or Displacement maps to deform a Sub Patch object, notice that the polygons when deformed look square again, not smooth. Go to the Object Properties palette, and set the Subdivision Order to Last. This forces *LightWave* to apply, or basically render, the final polygons after it has taken the deformations into account. Clever idea, and should really be set as a default.

Rendering Sub Patch objects
When rendering a Sub Patch object, go to the Object Properties palette and set the Render Sub Patch Level to something higher to smooth out the edges. This is one of the coolest features of *LightWave 6.0* and above. You can change the quality of your model right before you render it.

Maya tips

In a results-orientated industry like computer animation, one way to maximise performance is to customise your *Maya* interface depending on your role in production, says Bill Fleming

In a results-oriented industry such as computer animation, the end product is all-important. A studio may have the most talented animators in the world, however if their productivity is lacking then there is a good chance deadlines will be missed and budgets will be overspent. One way to help maximize your performance is to customize your *Maya* interface depending on your particular role in production.

Marking menus

One standard interface feature that is incredibly effective but often overlooked is *Maya*'s marking menus. Marking menus enable the animator to quickly and instinctively open windows, set keyframes, execute scripts, and just about anything else that is possible with *Maya*. Making extensive use of marking menus can improve workflow ten times over. To use marking menus, simply hold down the space bar then click and hold a mouse button. A quick movement in the compass direction of the marking menu will light the command. Releasing the mouse button will activate the button.

Avoid pulldowns

Pulldown menus are the basic form of navigation in almost every animation software interface. Unfortunately, they provide the most clumsy and non-intuitive interface for animating. Whenever possible, avoid pulldown menus and create marking menu shortcuts for frequently used operations. Any window that you frequently open and close can be inserted into a marking menu button.

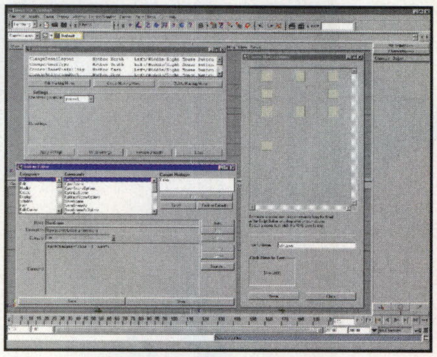
Hotkeys

Marking menus are even faster and more efficient than a hotkey. Animators often have to take their eyes off the screen to scan the keyboard to find the desired hotkey. Once activated, you then have to re-situate and re-focus on the previous task at hand. This can involve finding the spot on the monitor where you left off, repositioning hands back on the camera toggle/zoom controls and then proceeding. The whole procedure can become cumbersome, especially after you've repeated it hundreds of times in a single sitting.

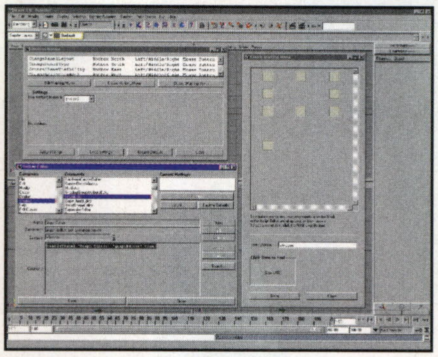
Marking menus on the other hand enable you to instantly open windows, set keys, and do just about anything without ever taking your eyes off the screen and without ever taking your mind off what you're are doing. Talented animators should spend their time animating, not stumbling around a clunky interface.

Create a marking menu

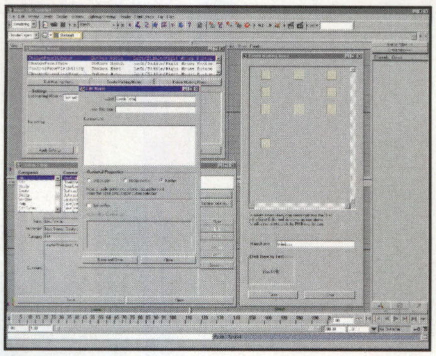
The following five steps describe how to begin creating a marking menu that provides instant access to some of the most frequently used windows in the *Maya* environment. This short tutorial will show you how to add a single window to your marking menu. You can repeat this process to add more windows to the other available boxes in the marking menu. Once you get accustomed to the speed, accuracy, and productivity achieved by using this dynamic feature, you'll never want to use another pulldown menu again.



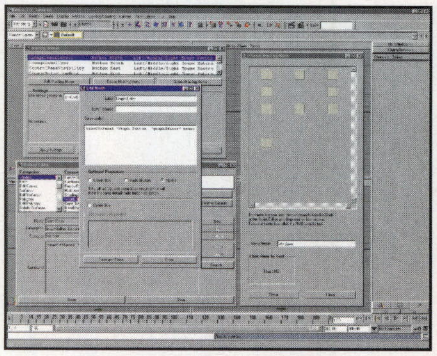
1 In the marking menu Set-up window, click Create Marking Menu. Name this menu 'Windows' then open the Hotkey editor.



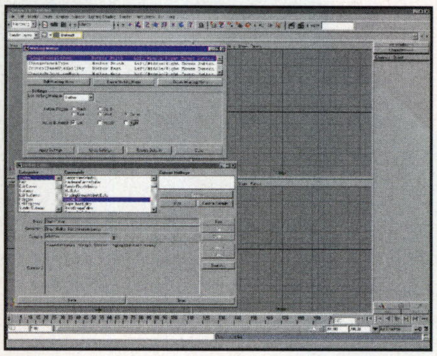
2 Select Window under Categories. Select Graph Editor under the Commands window. Copy the command script in the gray Command window.



3 Right-click on North square in the Create Marking Menu window. Select Edit Menu Item. Label this Graph Editor.



4 Paste the command into the Command field. Click Save and Close. Save and close the Create Marking Menu window.



5 Under Marking Menu Settings, Use Marking Menu In: Hotbox, Hotbox Region: Center, Mouse Button(s): Left. Apply Settings then Close.

Passion Pictures

A crop of high-profile music promos has borne fruit for animation experts Passion Pictures, who have: *"spent time cultivating our directors' talents"*

Olly Reid is the Passion Pictures director behind Robbie Williams' latest animated promo, *Let Love be your Energy*. Find out for yourself how his talent for caricature combined with *LightWave*'s modelling capabilities to create a 3D model of the cel-shaded superstar in our tutorial on page 40.

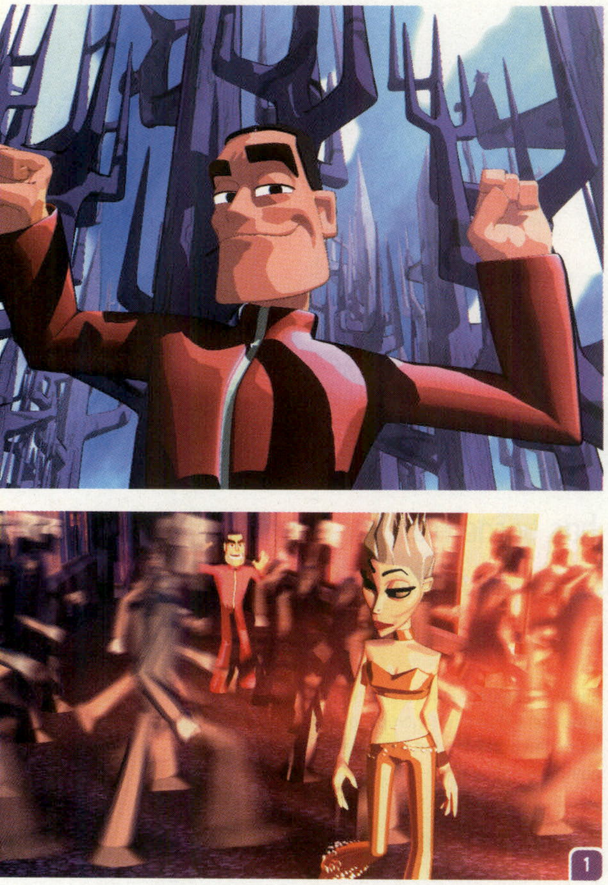
Passion Pictures is one of the prime stops on London's animation underground. Until recently it was best known for the BBC TV children's ad, *Future Generations*, a nostalgia-fest which stirred up memories of such bygone animated classics as *Mr Benn*, *Bagpuss* and *The Magic Roundabout*. Since the advert aired, though, Passion has been asked to turn its animation talents to the world of music, and a steady build-up of momentum has seen the company attract some prime cuts to marry to the diverse talents of its directors.

Passion's recent output covers both ends of the mainstream spectrum, from the more cultish appeal of Gorillaz' *Clint Eastwood* and King Biscuit Time's *I Walk the Earth*, to the tireless MTV rotation of Coldplay's *Don't Panic* and Robbie Williams' *Let Love Be Your Energy*, both Brit award-winning acts in 2001. Perhaps bands these days just can't face another three-day shoot for a video, but the upshot for Passion is an animated portfolio that would grace any production company's showreel.

A hand-made tale

Tim Hope's two promos produced at Passion, for King Biscuit Time and Coldplay, show a willingness on the part of the company and its directors to use all things lively, mess with the conventions of animation and be as instinctive as possible within the three-minute pop video context.

Tim's hypnotic *Don't Panic* promo is a good example of this adventurous outlook: his hybrid, hand-made style incorporates a range of found objects, from fireworks to water rippling in a goldfish bowl, to ➤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achieve the desired effect. These are interspliced with film clips imported from *After Effects*, specially-filmed live action, 2D cutouts and scanned textures, all layered together within the *3ds max* environment to create a personalised look that avoids the sterile surfaces and otherworldly feel of many 3D renders. "The thing about computer animation is that it lacks the visual depth that you get from real film," Tim says. "I'm just trying to create some of that visual depth and reclaim it for computers."

Most non-animated music videos create rhythm through editing, but animated ones often transfer this rhythm to the image itself. In *Don't Panic*, Tim built in a staccato, conveyor-belt like movement for some of his objects, creating a visual rhythm to complement the song's languid tempo. A relative newcomer to animation, but already an award-winner, Tim recalls that his discovery of *3ds max*'s potential was something of an epiphany: "I'd tried standup, I'd tried being in a pop band, but that was going nowhere. Computers came along and just showed me a whole new way of being me," he says. "I'm more me as a result of doing this: I'm more expressive and I can get things across more clearly as a result of using this software."

Sing when you're animating

Robbie Williams' latest single *Let Love Be Your Energy* called for a caricature of the Northern star to be recreated in 100 per cent CG, a task Passion Pictures handed to director Olly Reid.

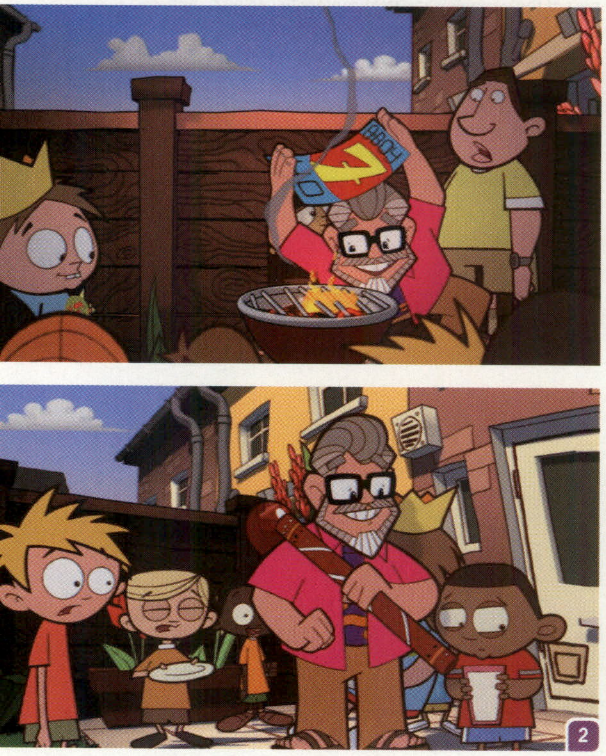
The record company's brief was unusually open, but it wasn't going to be easy to surpass Robbie's controversial skin-shedding 3D antics in his *Rock DJ* promo. "I went down the pub and came up with a whole range of idiotic ideas and went with the most hopeful," Olly says. "I don't have a singular style, the 2D came from me and that was more to do with timescale issues. There was no way we'd have been able to do a full-on 3D one with full *Toy Story* surfacing, we wouldn't have had a hope," he adds.

All modelling, lighting and surfacing was done in *LightWave 6.5*, with the skeletons, expressions and compensation morphs for animation created in *Messiah 1.57*. The time-saving cel shaded look was created using a Beta version of Big Eyes Small Mouth, and while Robbie's run cycle bought Olly time on the animation side, the cel shader method of manual colour picking presented problems of its own: "It gets quite complex when he's going from sun into shadow and he's wearing red and he's in the dark," Olly explains.

Luckily Olly had a team of animators and lighting specialists to help with the 180-plus shots, set in a succession of sumptuous locations: "I storyboarded it all and then made a computermatic of vague 3D sets that people could start fleshing out, but it meant that people could go in and animate within them from the beginning even when the sets weren't finished," Olly explains.

Olly's previous work for Passion Pictures, the Milk Advertising Board campaign featuring cartoon versions of boxers Prince Naseem and Chris Eubank, drew on his well-versed flair for caricature: "I did caricatures for ages, we used to go to balls and big business events and go round doing caricatures from table to table," he says. "It was good training, and good fun too – for a while." Read on for an insight into the way Passion Pictures reproduced Olly's Robbie Williams caricature in glorious 3D... ➤

Passion Pictures is based at Riding House Street, London. For more information **[e]** info@passion-pictures.com or **[t]** +44 (0)20 7323 9933. Feature by Owen Bailey **[e]** owen.bailey@futurenet.co.uk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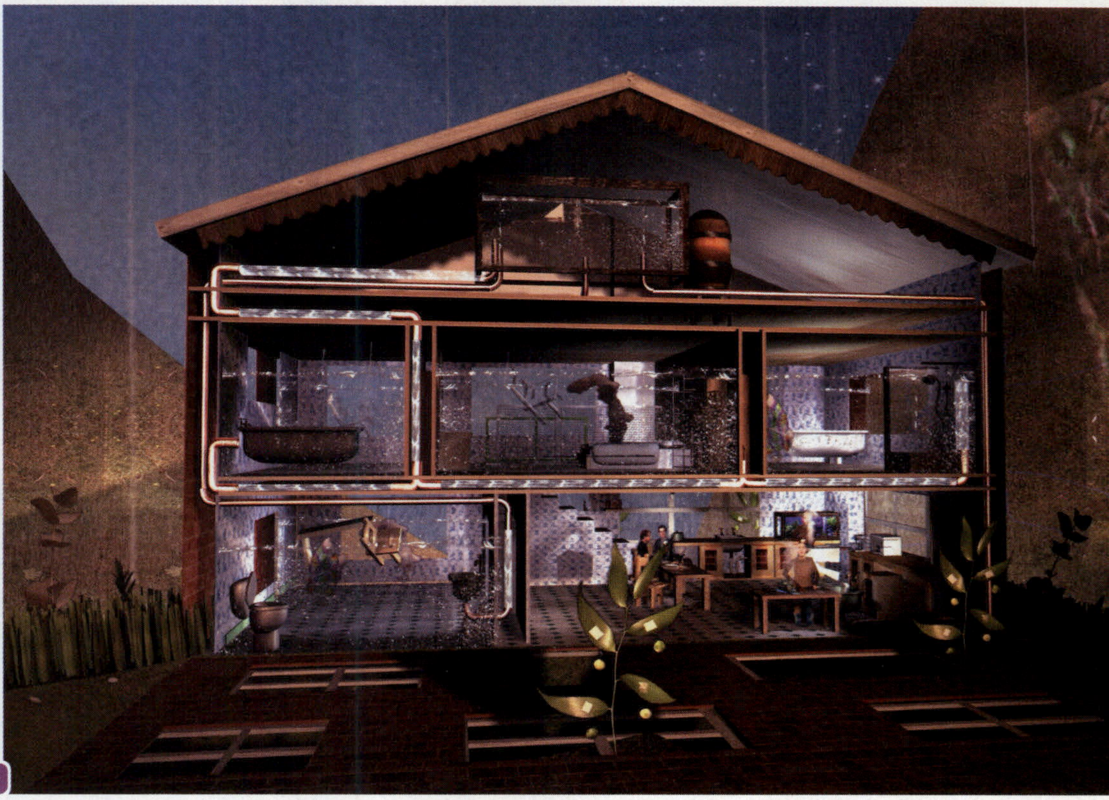
Men behaving sadly

The company's recent focus on animated promos began a couple of years ago, when Passion Pictures supremo Andrew Ruhemann was approached by cartoon director Mark Brierley, veteran of Aardman animation, with an idea for an animated CG short to use as promotional material.

The resulting film, *Hot Spot*, was Passion's first ever animated short. A stylised, comic tale of two men in a nightclub trying desperately to woo an implacable maiden with their rubbish attempts at dancing. Created by Mark using *Softimage 3D*, its deliberately stripped-down style indulges in a knowing wink to Mark's experience both as a cartoonist and as a stop motion animator.

Here's his deliberately-stripped down advice about cartoon animation in CG: "Four things: action is all to do with holds; lighting is more than just putting lights in a scene, you've got to light artificially to make it look more realistic," he explains. "Thirdly, sound is half the picture. If you take any cartoon and turn the sound off, you've lost a lot of the impact. The fourth thing is, the camera is one of the actors in a scene, not just a box on a piece of elastic."



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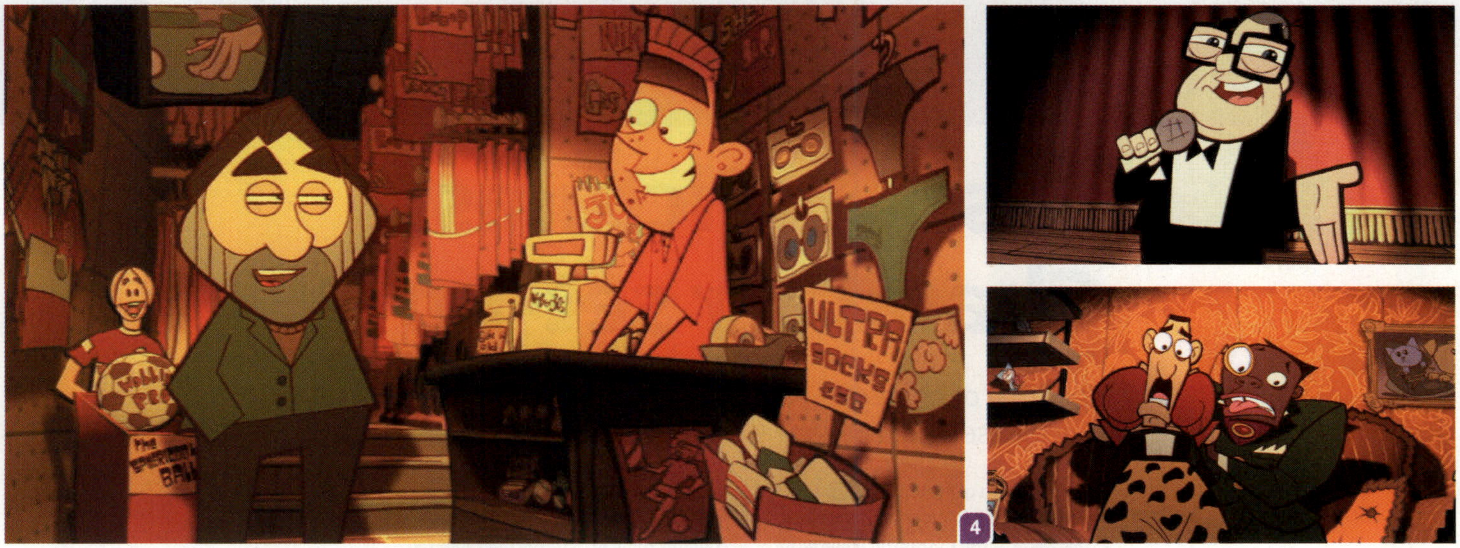

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1. Olly Reid particularly enjoyed the creative freedom he was given when working on the Robbie promo, but the cinematic camera moves and constantly changing backdrops that Robbie runs through required a concerted effort from a team of modellers and animators. In all, the project took 12 weeks to animate.

2. Animated antipodean Rolf Harris was one of the characters in Passion Pictures' memorable campaign for the Milk Advertising Board. Olly Reid designed all the other characters and backgrounds in the campaign using *LightWave*, and dedicated 2D animators brought them to life.

3. Tim Hope's promo for Coldplay's *Don't Panic* single plays with the idea of water destroying everything, and was created using *After Effects* and *3ds max*. "I like making adventures, which is what my films are anyway," he says. "Maybe I could make something more ephemeral and strange and ambient but I'm not sure I'm ready – maybe one day," he adds.

4. Olly Reid acknowledges the difference in style between the Milk ads and the Robbie promo, and for his next project wants to extend the boundaries of his style further: "I'll maybe try something outside of the 2D look. I'd love to do that, make it really cartoony and push it as far as Ren and Stimpy pushed things," he says.

Image: Passion Pictures [e] mark@passion-pictures.com

Passion Pictures: Character set-up

The goal of character rigging is to create a simple and efficient set-up. Mark Wilson shows you how...

Most of the top 3D applications offer a variety of very powerful features for setting up characters for animation. Getting the most out of these tools requires a good understanding of animation, and experience in your application. The goal of character rigging is to create a simple and efficient set-up for yourself and other animators to work with. The tools available can be divided into two general categories, deformation and animation control. We will be focusing mainly on the animation control side. Regardless of your preferred software or platform, what follows is a general guide to help you plan your rig. For the exercises, we will be using our preferred character animation tool, PMG's *Messiah*.

The first stage of any character rig is to set up the deformation. This can be done using bones or other similar effects dependent on software. The image above shows the bones for our featured character Robbie. Once the deformations are working correctly it is time to work with the animation control.

Expertise provided by Mark Wilson, Technical Director at Passion Pictures
[e] mark@passion-pictures.com.
For info on *Messiah 1.5*, go to
[w] www.projectmessiah.com

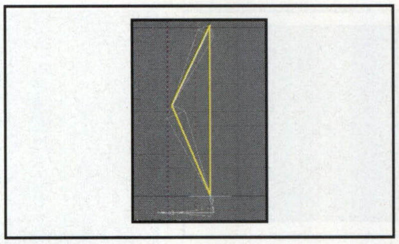
The files for this tutorial are on the cover CD in the Passion folder.

Part 1: Legs and feet

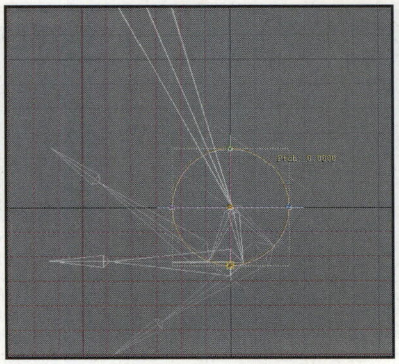
The first step is to make an IK chain for the whole leg

Expressions

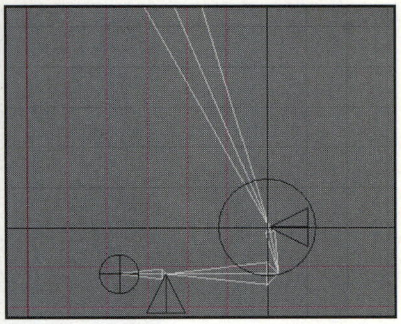
An Expression is a mathematical statement which links one object to another. Most 3D applications have some form of Expression engine and although the syntax varies, the principles are usually the same. Exp.avi shows a simple use of Expressions to drive position and rotation channels.



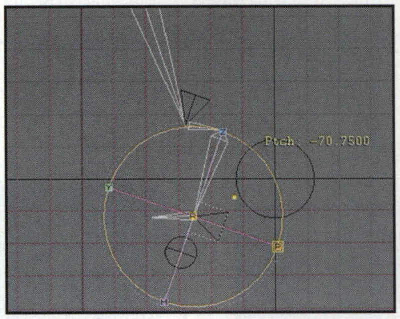
1 Starting with the leg bones, the first step is to make an IK chain from the thigh down to the heel. This grab shows the IK chain and IK.avi shows the IK in action. Note the foot is always at 90 degrees to the shin – this is because it is parented to the shin. Real feet have independent rotation so we need to use an alignment constraint to override the parent's rotation or separate the foot and then re-attach it with a moveTo function. IK2.avi shows the same motion with an independent foot.



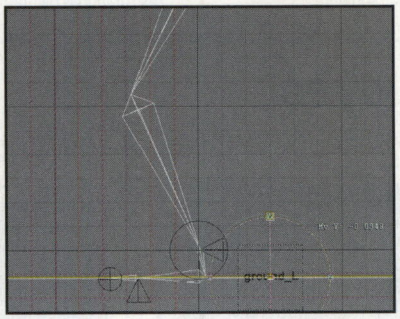
2 The next stage is to link the foot's rotation to the control null that is the IK goal. This enables the animator to quickly position and rotate the foot to block out a pose. See Foot1.avi.



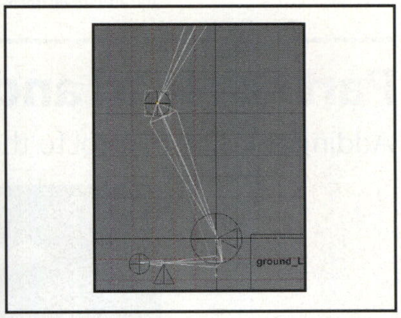
3 Puppets are replacement objects to aid control. You may be used to using a null object to control the IK, but here we have replaced those nulls with simple, modelled wire objects. This enables us to easily see the control objects and easily pick them. Also note the extra objects for step 4.



4 Okay, so the basic set-up is done. You could block out the leg animation with these controls but it isn't particularly flexible. To add more flexibility, we need to add control at the ball of the foot. This will enable us to put our character on tip toe or stub out a cigarette with the foot. Depending on your chosen software, this can be a little bit more complicated. Look at Foot2.avi for the result.



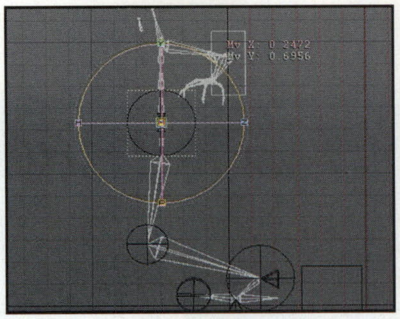
5 Writing an Expression to prevent the feet going through the ground plane is easy and will save you time while animating. Many animators set an object as a reference for the ground plane so that it can be animated if the character needs to go upstairs or run on an uneven floor. Here we can see the ground plane object and FootGround.avi shows its functionality. Foot3.avi shows the result.



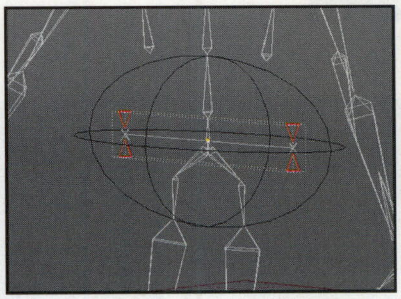
6 The last step is to add a knee control. This enables the animator to point the knee in a particular direction. For this, we attach a control object to the top of the shin and drive the thigh's bank channel with the knee control bank. You could also use a method called upvector or kneeconstraint depending on your software. This grab shows the object in position and Knee.avi shows it moving.

Part 2: Hips and spine

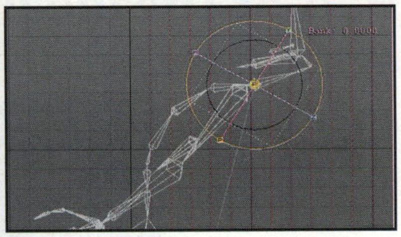
Adding two hip control objects for upper body control



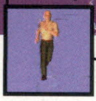
1 For the hips, we'll add two control objects, one of which will control the positional movement of the whole upper body. This grab shows the result of moving the hips forward. HipMove.avi shows them moving around. Note that we don't use any automation to place the hips in-between the feet: this is because it gets in the way of animation.



2 Here we've got the full Robbie skeleton with the hip control objects in place. We're using two control objects for the hips: one for local rotation and the other for full body rotation. The local rotation rotates just the hips with the spine unaffected and the full body rotation rotates the hips and the spine as one. Hips.avi shows all of the possible rotations with this set-up.

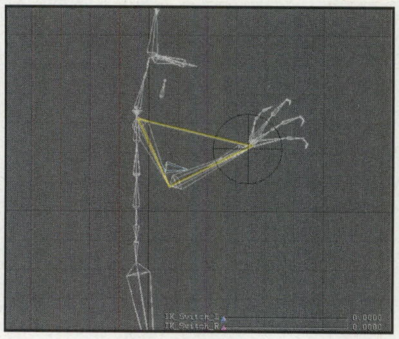


3 With the hips set up, we need the spine to have some flexibility. For this we use an Expression which adds a percentage of the Rotation value of the control object to the base bone. This value then gets multiplied as it passes through each child in the spine's hierarchy. Sounds complicated but is actually very easy to set up, and gives the spine a nice arc. Because the spine is capable of bending in a multitude of ways, we also leave each bone open to manual keyframing if the animator requires a more complex shape. See Spine.avi. ➤

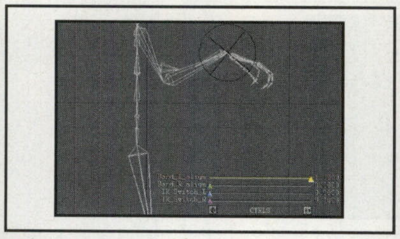


Part 3: Arms and hands

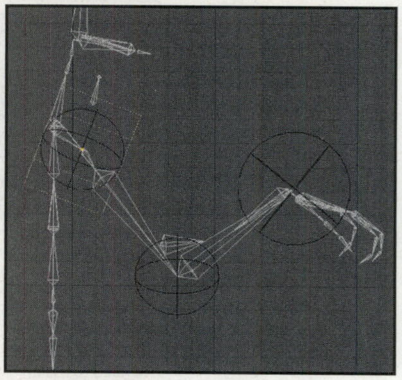
Setting up the arms with and without IK



1 We'll set up the arms using IK because many animators prefer to animate arms this way. However, we'll also add a slider to fade the IK out in case we need a specific move or another animator prefers to animate arms without IK. So the first stage of arm set-up is to make an IK chain from the top arm to the forearm as shown.



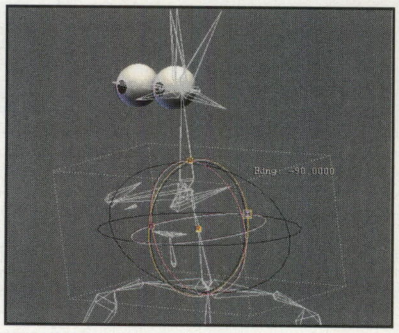
2 When animating a run or walk cycle, it's very useful for the hands to be aligned with the wrists. However, for most other animation it's useful to have a separate rotation alignment for the hands. To implement this effectively, we've assigned the alignment to another slider so we can blend between the two states. This is useful if your character has to keep its hands locked on a surface and then walk off. See the hand.avi for reference. In this animation, the hands are aligned with the control objects then the left hand moves away and its rotation is blended back to align with the wrist.



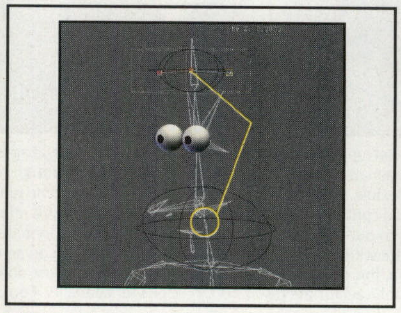
3 To finish off the arms, we need to add controls for the elbows to work the same as the knees in the leg set-up. Also, we add a shoulder control which drives the rotation of the shoulder bones. Elbows.avi shows them all in motion.

Part 4: Head and eyes

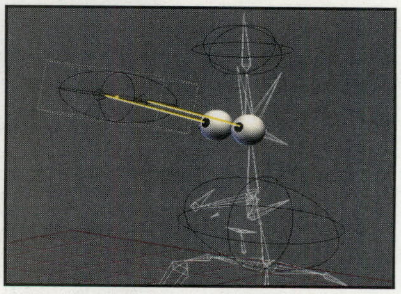
Adding rotation control to the head, IK to the neck and targeting to the eyes



1 The final stage of the set-up is to add some control to the head. Let's start by adding a rotation control for the head. This enables us to rotate the head to any angle.



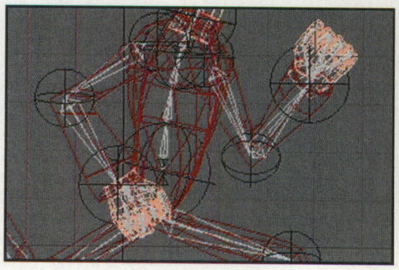
2 Now that the head is aligned to the rotation control, we have added IK to the base of the neck. This gives us the movement from the IK but the head stays aligned to the control thus giving us a lateral movement. See Head1.avi.



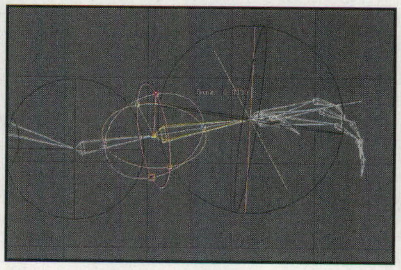
3 With the head set up, it's time to add control to the eyes. We're using a master control object which has two children acting as target objects for the eyes. You can use IK to target the eyes but we've used *Messiah's* in-built Target function for simplicity. Eyes.avi shows the eyes in action.

Part 5: The ideal arm

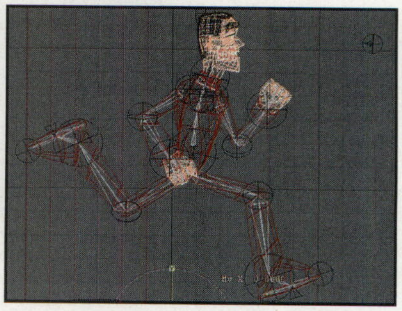
Here, we're using the wrist to help rotate the hand



1 For the Robbie set-up, the hands are separate objects so we've decided to cheat the way the wrist works and just have the hand rotation rather than the entire forearm. For most other characters, you can split the forearm.



2 Once split, we align the hand's heading and pitch rotation to the control object but leave the bank channel to be driven by the forearm's bank. This gives a more natural twist in the arm. See ideal_arm.avi.



3 Here is the set-up animated with the geometry ghosted for reference. Check out Robbie.avi on the CD. ca>s

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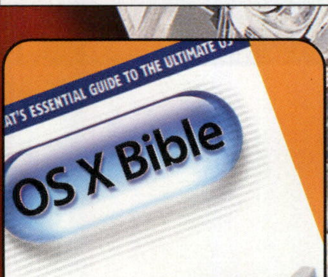

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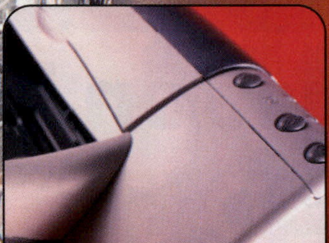

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Image: Steve Holmes

Facial animation in Lightwave 3D 6.5

With a host of cool techniques, facial and character animation in *LightWave* is no longer a tough goal to achieve, says Steve Holmes

Expertise provided by Steve Holmes
[e] steve@outlawfx.com

The files for this tutorial are on the cover CD in the **Dual\tutorial\LightWave** folder. For more info on prices & upgrades **[w]** www.newtek.com

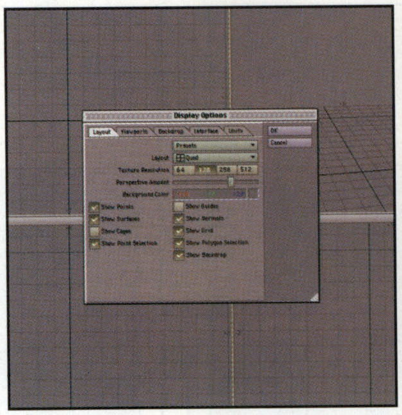
Version 6.5 of the visual effects and animation industry's favourite package, *LightWave 3D*, has brought the software to a new level of modelling, texturing, animation and rendering, far superior to any of its competitors. Using a simple mixture of bones, endomorphs, weight maps and nulls, the most amazing and realistic animations can be easily achieved. Creations like the animated TV series *Roughnecks: Starship Troopers Chronicles*, a totally 3D-generated show, have already proved this.

Part 1: Setting up our alien character

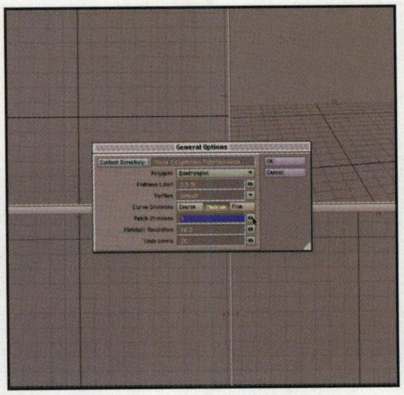
First, we need to prepare our polygonal model for easier editing and animation

Shortcuts

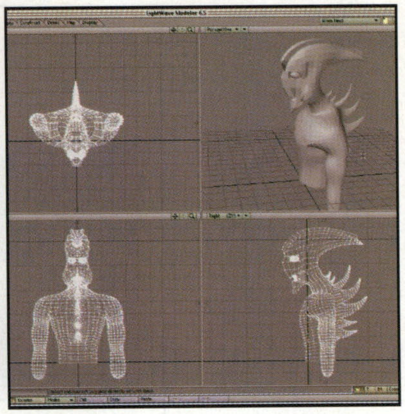
Use Option to rotate the 3D object, and use Option Control to zoom up and down on it. The same shortcuts apply in the Planar view panels.



1 Launch Modeller 6.5, go to Modeller> Options>Display Options. Set the Display Options so the Cages and Guides are turned off – this makes it easier to see what we are doing when selecting polygons.



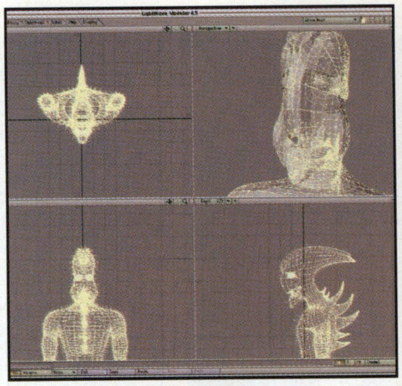
2 Now go to Modeller>Options>General Options. Click the Content Directory button, and choose the project folder called Alien Project from the CD. This ensures all elements are loaded and saved in the right place. Also, set the Patch Divisions to 3, but more on that later.



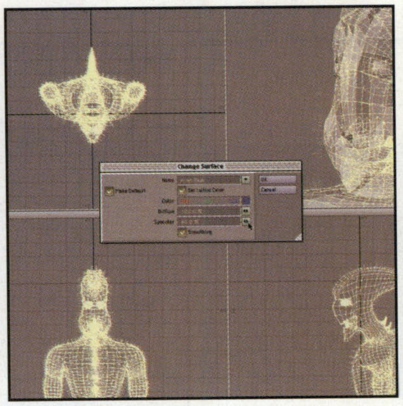
3 Go to File>Load Object, and choose Alien Head.lwo. Now use your Option/Alt key in the 3D view (top-right) to drag the model around and see it from different angles. It is a polygonal model so we can begin to smooth it out and set it up.

Surfacing

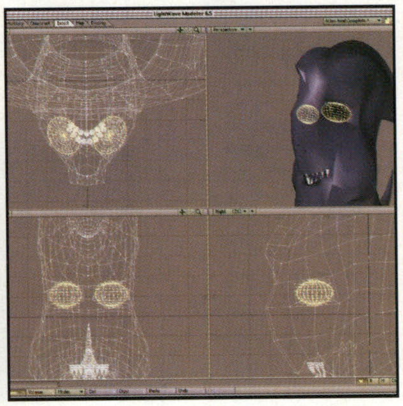
To access Surface, hit 'q' on the keyboard. Much faster!



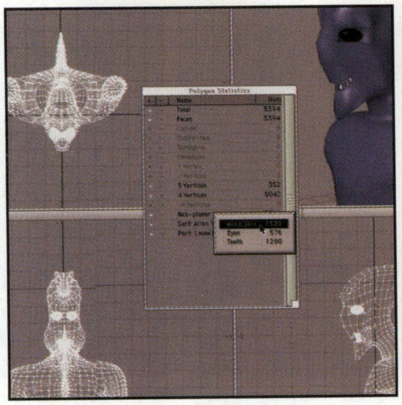
4 Zoom up on the Alien's face by holding Option+Ctrl/Command and dragging. At the bottom of the screen, choose Polygon Selection mode, and click on one of the facial polygons in the 3D view. Hit] and the whole body mesh will be selected.



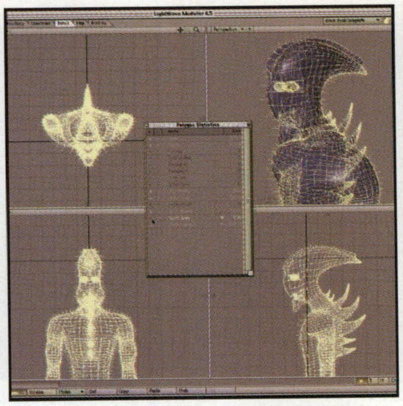
5 Go to the Detail tab and choose Surface. Name this surface Alien Skin, choose a colour, and add some specularity for now. Most importantly, turn Smoothing on. Click OK, then click in the grey bar below the left menus to deselect the polygons.



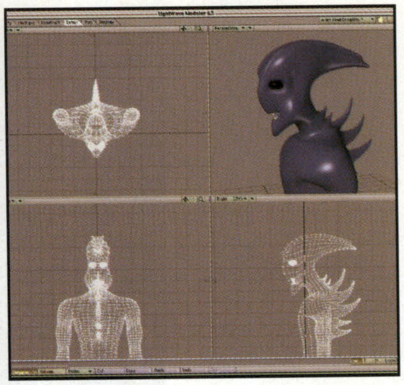
6 Now do the same for the eyes and teeth, setting different smoothed surfaces. Select one polygon, hit] to Select Connected, go to Surface and apply basic options. Our character now has coloured surfaces to make work easier.



7 Now we make our object a smooth, Sub Patch model. First, making sure Polygon Selection mode is still active, hit the 'W' key to bring up the Polygon Stats window. Click the Surf menu, and choose the Alien Skin surface.



8 Hit the little white + sign next to Surf to select the polygons using Alien Skin. Then, choose the eyes surface and click +. This has now selected all the polygons we wish to Sub Patch, and not the teeth – they are fine as smoothed polygons.



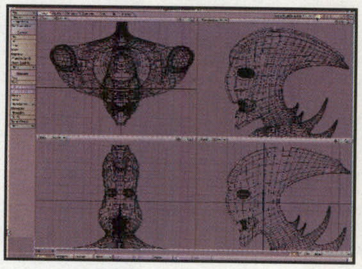
9 Finally, hit the Tab key to make the selected polygons Sub Patch, then deselect. Our Alien now looks somewhat different – much better! With our Patch Division preference set to 3, this means that we see nine polygons for every one we have. Save your model. ➤

Part 2: Adding bones to the head

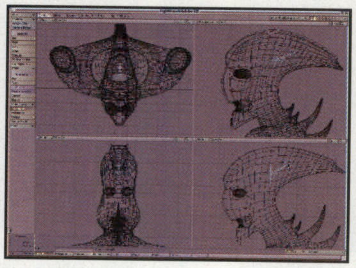
We are now going to use Skelegons to create bones to enable us to bend the rear part of the head

Adjusting Skelegons

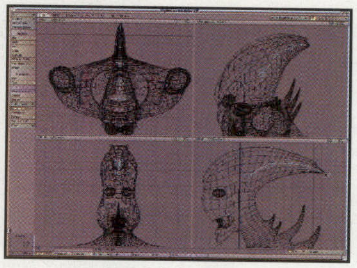
If the Skelegons need adjusting, hit the Spacebar to lose the tool, select the Skelegon, go to the Modify tab, and use Move or Rotate to adjust. The other Skelegons are connected and will move accordingly.



1 Magnify up on the rear of the head, in all views. Use Option+Ctrl/Command and drag, or hit Control-Z and use the Magnify tool. In the top-right of the window, select the top half of Layer 2, and the bottom half of Layer 1. We will create the bones in Layer 2, using 1 as a template.



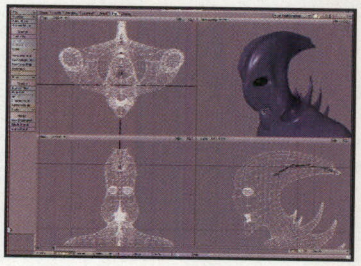
2 Using the Skelegon tool, and the Right Planar view, click once towards the back of the skull and again to the top-right of that to create the first Skelegon. Note that this creates the Skelegon centrally along the Z axis.



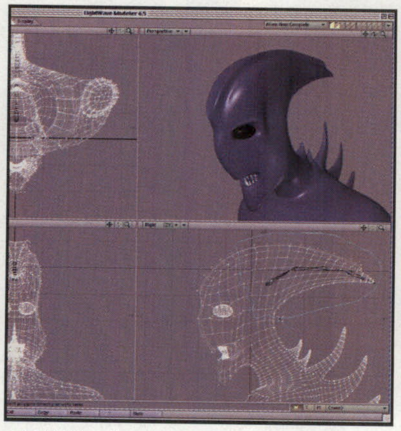
3 Now click three more times towards the back of the head to create the chain of Skelegons. The first one we created was the parent, and these are child Skelegons. Rotate round in the 3D view to check the position of the Skelegons.

Quick navigation

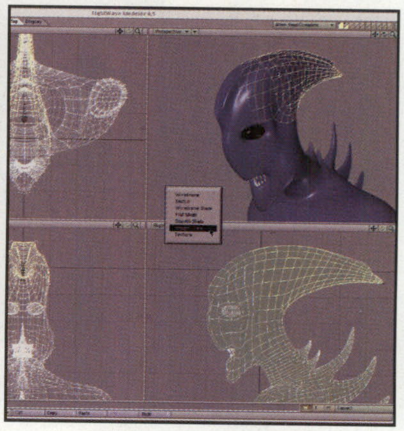
To navigate quickly between layers 1–10, use the numbers 1–0 at the top of the keyboard (not the keypad). To show more than one layer, hold Shift and hit the layer number.



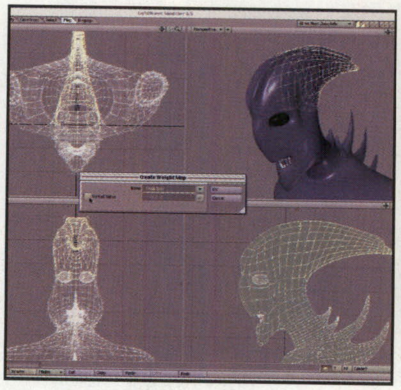
4 If we animated these bones in *LightWave*, the whole body would bend, so we need to create an area for them to affect. Hit the apostrophe key (') to switch Layer 1 to the foreground and Layer 2 to the background.



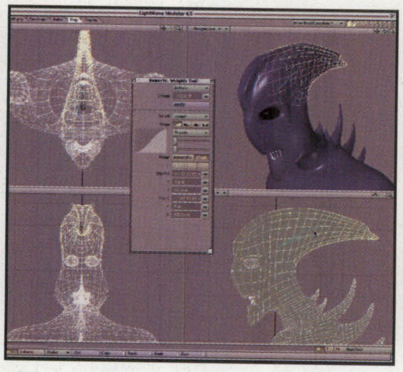
5 Holding down the Apple key (or right mouse button), drag a lasso area around the polygons we wish to affect, in the Right view.



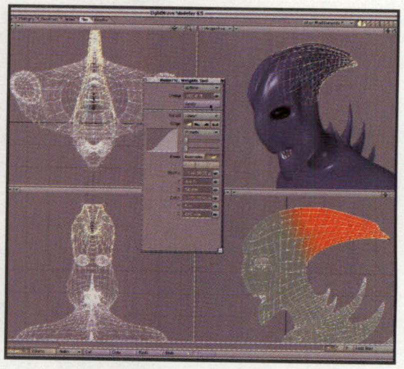
6 Now, in the Right view, set the View mode to Weight Shade. This enables us to see the affected area when we apply the weight map.



7 With the 'W' Button selected in the bottom-right of the window, go to its pop-up menu and choose New. Give this weight map a name of Head Rear, and ensure the Initial value isn't selected. We will create our own with more control.



8 Go to the Map tab, and choose Weights. Hit the 'n' key to access the palette for this tool, and choose Linear from the pop-up menu. From the Presets menu, choose Smooth. Hold down the Apple key (or right mouse) and drag a map from the left towards the middle of the head.



9 Finally, check the Change value is 100 per cent and click Apply. This applies a smooth weight map to our selected polygons. Lose the tool (Spacebar), deselect the polygons, reset the Right view to Wireframe, and Save. Go to Layer 2, Cut (x) the Skelegons, go to Layer 1 and Paste (v).

Part 3: Selection sets and endomorphs

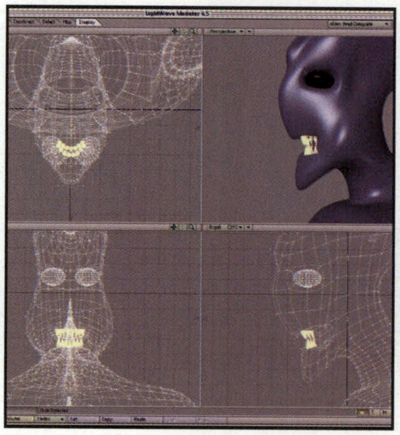
We can now create an endomorph for one of the Alien's Expressions

Don't undo

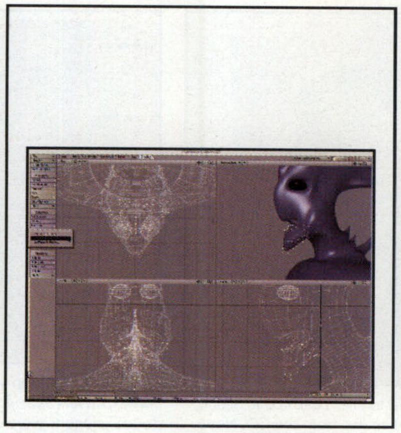
To Hide Selected, hit -. If nothing is selected, this hides everything! To Unhide, hit \. An easy mistake to make when accidentally hiding something is to Undo. Hiding is not a function to undo, so even though the object is hidden, you are undoing your previous changes!

Stats window

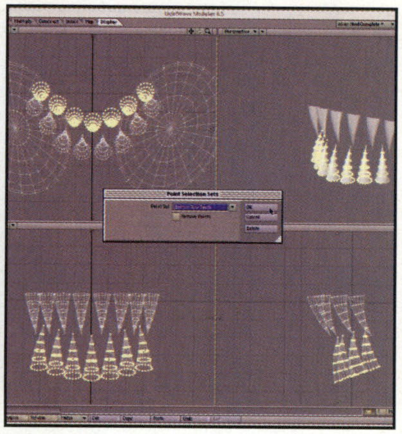
When in Point or Polygon Selection mode, and requiring the Stats window for either, just hit 'w'.



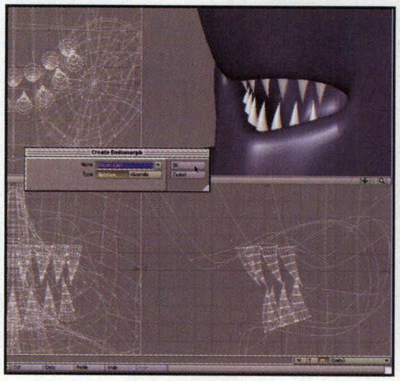
1 Magnify up on the Alien's face. In order to make our endomorph creation easier, we need to group points together for easy selection. First, use the Polygon Stats to select the teeth, then go to the Display tab and choose Hide Selected (-).



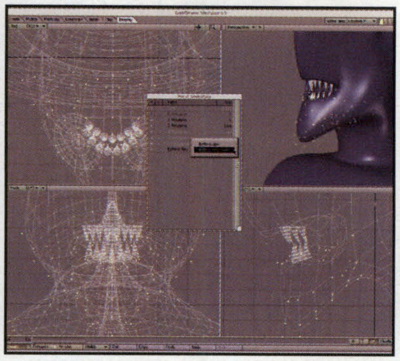
2 Make a lasso selection of the points that make the bottom jaw. Now go to the Display Tab>Selection>Grouping>Point Selection Sets, and name this set Bottom Jaw. (Doesn't look so scary without his teeth, does he?)



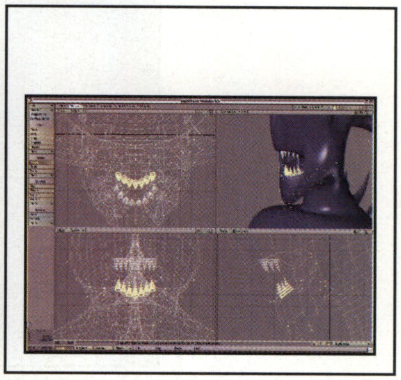
3 Go to the Display tab and Unhide. Use Polygon Stats to select the Alien Skin surfaced polygons, and Hide them. Magnify up on the teeth, and make a Point Selection Set of the bottom row. When done, Unhide.



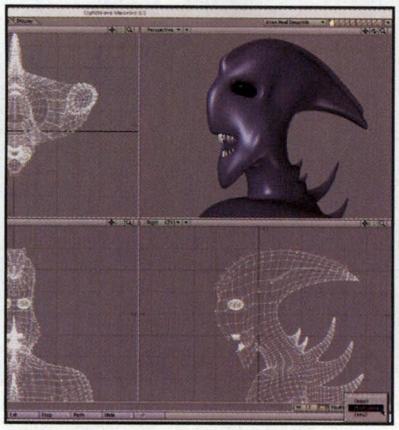
4 Select the 'M' button in the bottom-right of the window, go to the pop-up menu and choose New. We are making a new endomorph, an end-stage of an Expression we can animate between. Name it Mouth.Open and click OK.



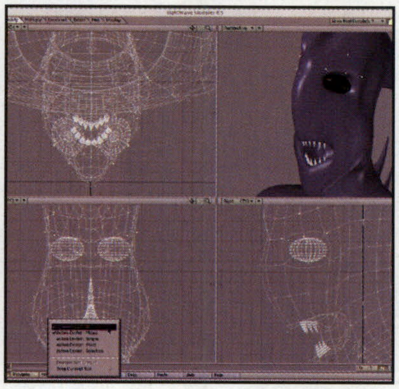
5 At the bottom of the screen, choose Point Selection mode, and bring up the Point Stats window. From the bottom pop-up menu, choose Bottom Jaw and hit the small white + to select the points. Do the same with the Bottom Row Teeth – now we have our points selected.



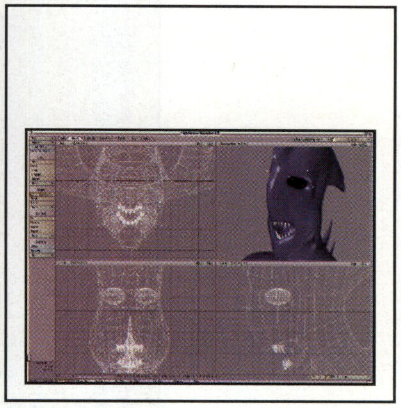
6 Go to the Modify tab and choose Rotate (y). Place the cursor somewhere in the corner of the mouth in the Right Planar view, and drag to the left about 20 degrees. This opens the mouth to a nice roaring position. Fine-tune if necessary.



7 Now flick back and forth between Base and Mouth.Open from the M button pop-up menu in the bottom right of the window to see the changes. Looking good so far...



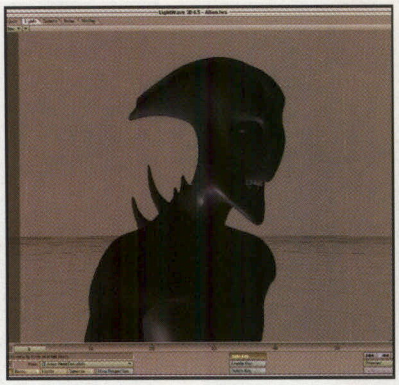
8 Let's make this dude look a little more angry. Go to the Modes pop-up at the bottom of the screen and turn Symmetry on. Make a selection of the four points above the eye on one side of the model (make sure the Mouth.Open endomorph is selected).



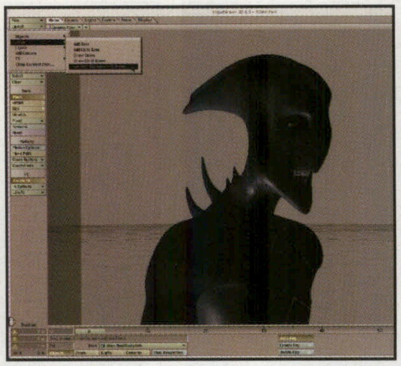
9 Using the Rotate tool again, in the Front Planar view, position the cursor dead between the eyes and drag to the right about 22 degrees. Our character now furrows its eyebrows when it roars. Deselect the points, and Save the model. ➤

Part 4: Final animation within LightWave

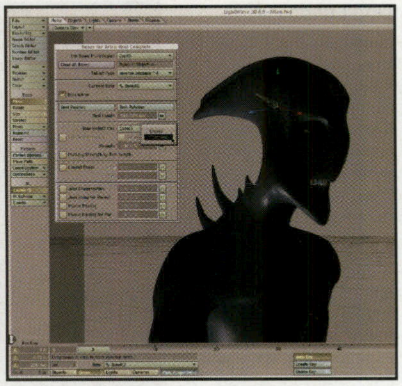
We're now ready to put it all together and animate it in *LightWave*



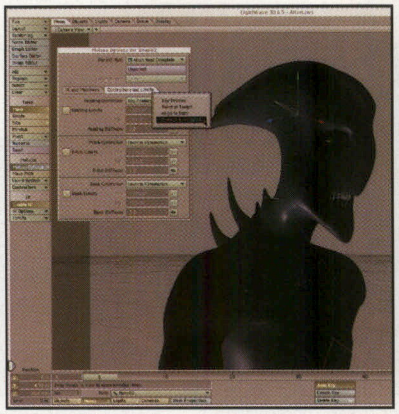
1 Launch Layout. Go to File>Load>Load Scene, and bring in the Alien.lws from the CD. Now go back to File>Load>Load Object, and bring in the Alien Head.lwo. Hit 6 on the keyboard, and we now see the Alien in its render position from the Camera.



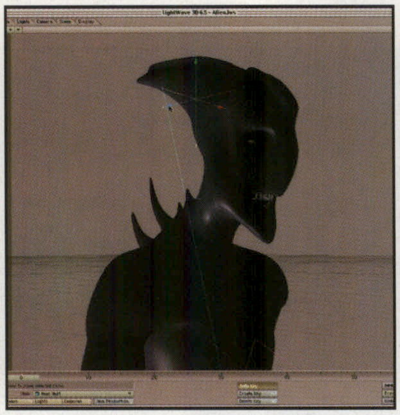
2 With the Alien selected, go to Add>Bones> Convert Skelegons to Bones. This tells us that four Skelegons were converted to Bones, and we can see them in our window before the Alien redraws. Go to the Bones Selection mode at the bottom of the screen, and choose Bone01.



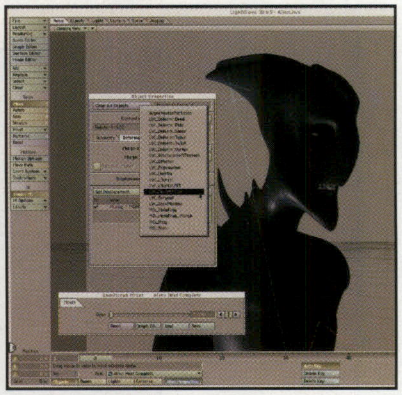
3 Hit p for the Bone Properties palette. From the Bone weight map pop-up, choose Head Rear. Now, using the Current Bone pop-up, select each other bone and apply the same weight map. When done, hit 'm' for the Motion Options for the bones.



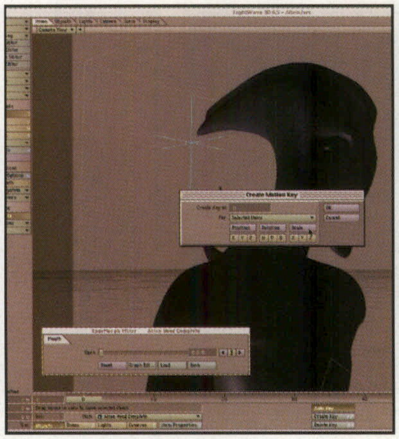
4 For each bone, go to the Controllers and Limits tab, and Set Inverse Kinematics for each axis from the pop-up. This will enable all the bones to affect each other by their movement, making it much more realistic.



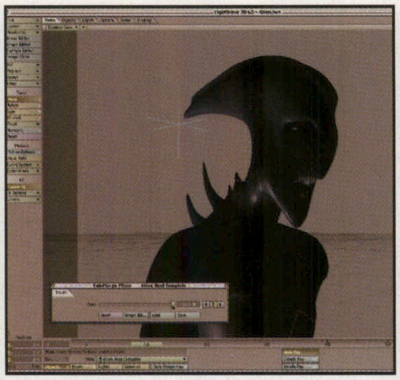
5 When done, select the final bone, and go back to the IK and Modifiers tab. From the Goal Object pop-up, choose Head Null and select Full Time IK. Close this window, select the Head Null in the scene, and move it.



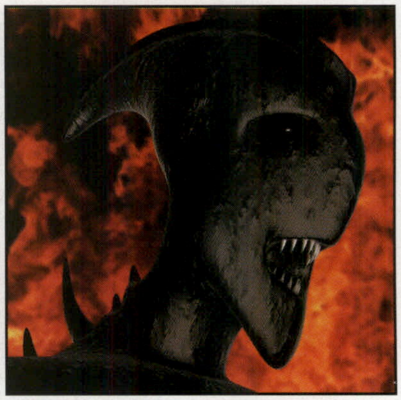
6 Now for the endomorph. Select the Alien Head.lwo from the Object pop-up menu, and hit 'p' for its Properties palette. Go to the Deformations Tab>Add Displacement>Morph Mixer. Double-click the Morph Mixer name in the window to activate the palette.



7 Hit the Return key to add a keyframe to our animation at 0 seconds. Click the Position, Rotation and Scale buttons to deselect them, and click OK. Now go to 10 frames along the timeline.



8 In the Morph Mixer window, drag the percentage scale to 100 per cent to open the Alien's mouth, then apply another keyframe by hitting Return and then OK. Now go to 35 frames along, drag the Mixer back to 0 per cent and add another keyframe. Do this as much as you want, to whichever percentage value you wish to use.



9 All we do now is hit the Play button in the bottom-right, and our Alien roars as we told it to. If we keyframe the position of the Head Null, its head will move as it roars. Now you see how easy it is to use endomorphs, you could add many more and mix them. Enjoy! ca•s

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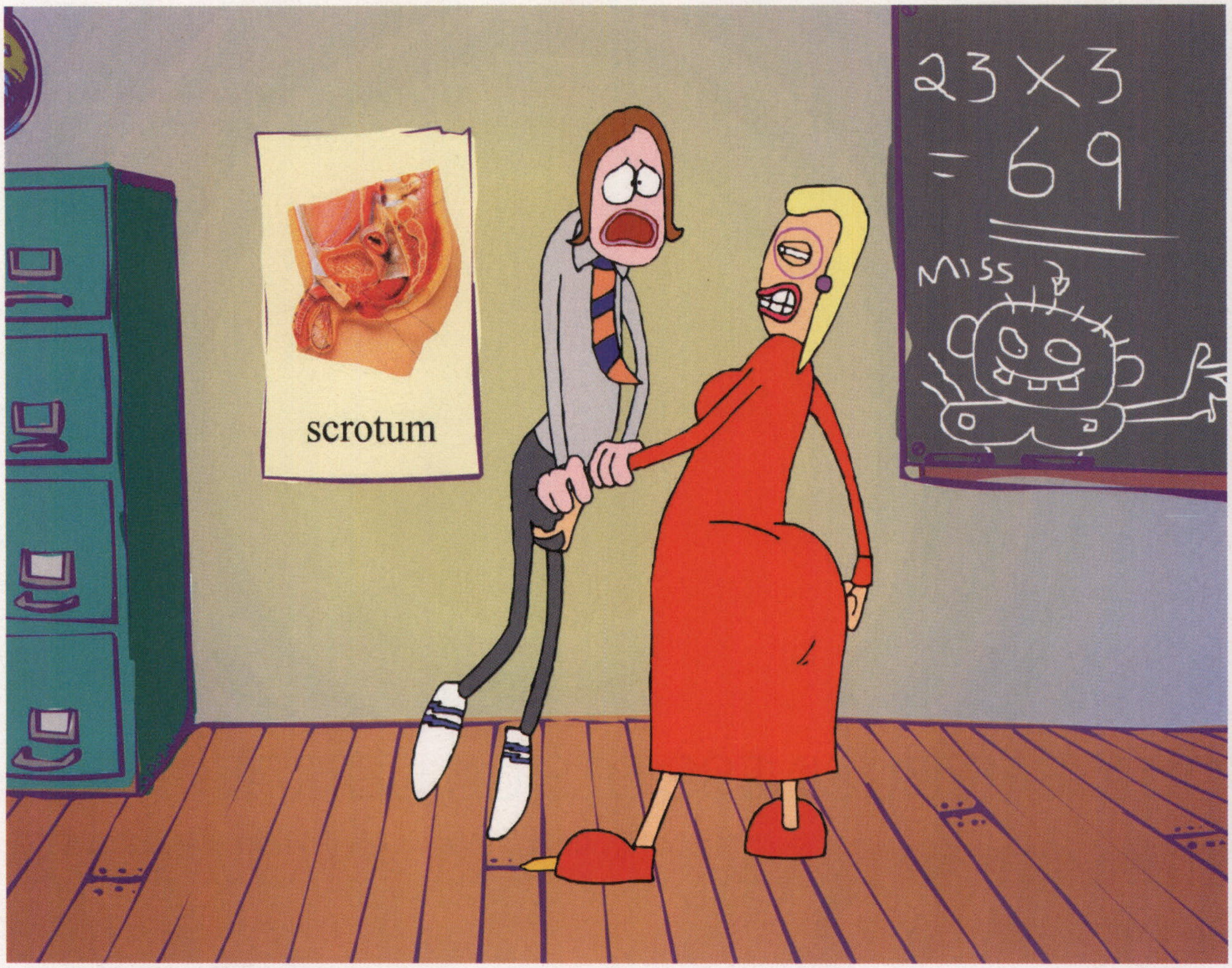
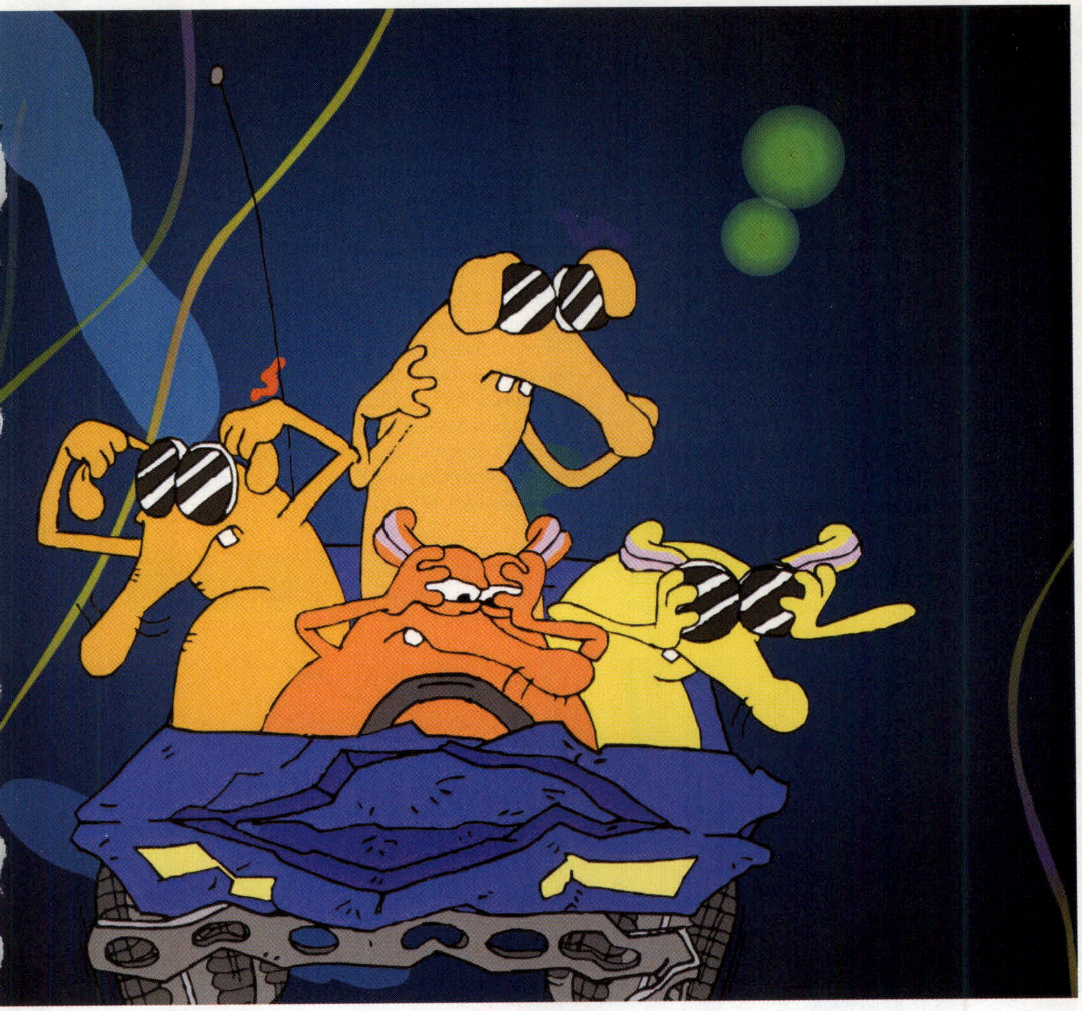
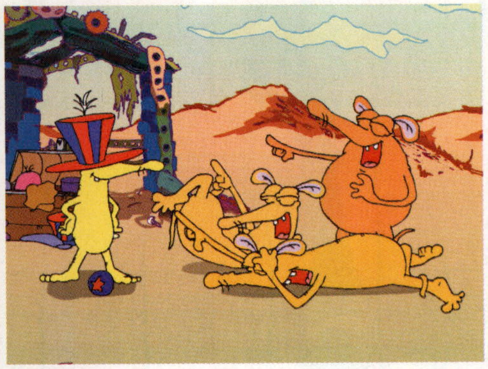


Teenager Johnny Casanova has heard that putting cheese in your trousers makes you attractive to girls, and here he's caught by a teacher with half a pound of stilton in his pants. "I'm really enjoying making the series," says Andy. "The writer Jamie Rix is brilliant. Johnny has appeared on the cover of a magazine (*Animation UK*) and been invited to appear at several animation festivals – that's just from the pilot."





Uncontrollable Hamsters is a work in progress, planned for Web and TV. "It's aimed at kids aged nine and over," Andy explains, "as it's quite dark. The five-minute pilot was drawn and scanned in with the composition in *Flash*. I've always wanted to do a *Mad Max*-style cartoon with weird characters and crazy vehicles. We haven't approached any broadcasters yet – we're just finishing the script…"

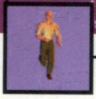
Fictitious Egg

It produced the UK's first online animation series and put *Flash* cartoons on TV. Fictitious Egg talks about celebrity freaks, Johnny Casanova, and sex in the animal kingdom: *"It's not your everyday animation…"*

When asked how he would describe Fictitious Egg, its founder replies: "Not everyone's cup of tea." And if your cup of tea is cute characters for kids, one visit to Eggtoons.com will have you typing Disney into a search engine before anyone can say 'beastly behaviour'.

Fictitious Egg Productions kicked off in 97 with *Tommy Sausage*, the UK's first online cartoon series. The *Flash* animation ran at Eggtoons.com and was visited by 600 people a day – an impressive figure back then. Four years later it's one of the UK's top animation studios, with clients like Universal, Granada, Atom Films and Channel 4.

The wheels were set in motion in 95, when Andy created *Beastly Behaviour*: 52 comedy shorts about the copulatory practices of animals, full of perversion and debauchery. It aired on Channel 4 and Paramount Comedy. "I was a partner in Honeycomb Animation ➤



studio," he says. " Before that I'd worked on shows like *The Teenage Mutant Turtles*, but this sparked an interest in off-the-wall animation for the Web."

Since the deviant days of *Tommy Sausage*, a succession of Egg characters have run riot. 98 saw *Sid Sidesplitter*, a series about a cabaret artist who decapitates himself every episode, currently appearing at Atom Films' entertainment site.

Sid was followed by *Floyd Luteo* (the hero is a bacteria by day, comedian by night), a bi-weekly series still airing on Granada's G-Wizz site; and the *Celebrity Freakshow* for Switch2.net (imagine Pete Sampras as a tennis-playing gorilla and you get the picture).

This Bristol-based studio specialises in *Flash*, and is geared up for Flash-to-video production. "We use PCs with NT and 98. Because the work is rendered for broadcast, we have about 500GB of storage machines. Our characters are drawn on paper and scanned in – the style is 2D cartoon with flat colours. People don't believe it's done in *Flash*, which is a compliment."

The style is also humorous, so Andy's influences come as no surprise: "Tex Avery and Chuck Jones are my heroes – those classic 40s cartoons. Bob Godfrey, *Monty Python*, Tommy Cooper, contemporary comedians like Simon Munnery..." Could we be talking to a repressed comic? "It was my childhood dream, but animation is my way of making people laugh – it's also about timing and performance..." As we approach the subject of the future, Andy perks up further still, talking about the fusion of Web and TV: "I want to explore online animated advertising. Everyone hates banner ads – I see a future in animated *Flash* toons as adverts."

The future will also bring more of Fictitious Egg's most well-known foray into the Web/TV crossover: *Johnny Casanova*, created by Jamie Rix. Johnny's attempts to get a girl appeared on Channel 4 last September in a five-minute pilot episode, co-produced with Elephant Productions, and the response has been huge. The team is currently working with Universal on a series.

"There'll be more of *Floyd Luteo*," adds Andy, "a top-secret project for a major broadcaster, and *The Uncontrollable Hamsters*." He's referring to a brand new series for older kids, involving hamsters on motorbikes. "It's for TV, but we're also creating Webtoons and a dedicated site."

In the meantime, you can find out the techniques behind Johnny Casanova's antics in the tutorial on the following pages. ➤

Fictitious Egg can be contacted on **[t]** 0117 971 9945 and **[e]** andy@eggtoons.com. Find out more at **[w]** www.eggtoons.com, or check out the company's showreel on your CD.

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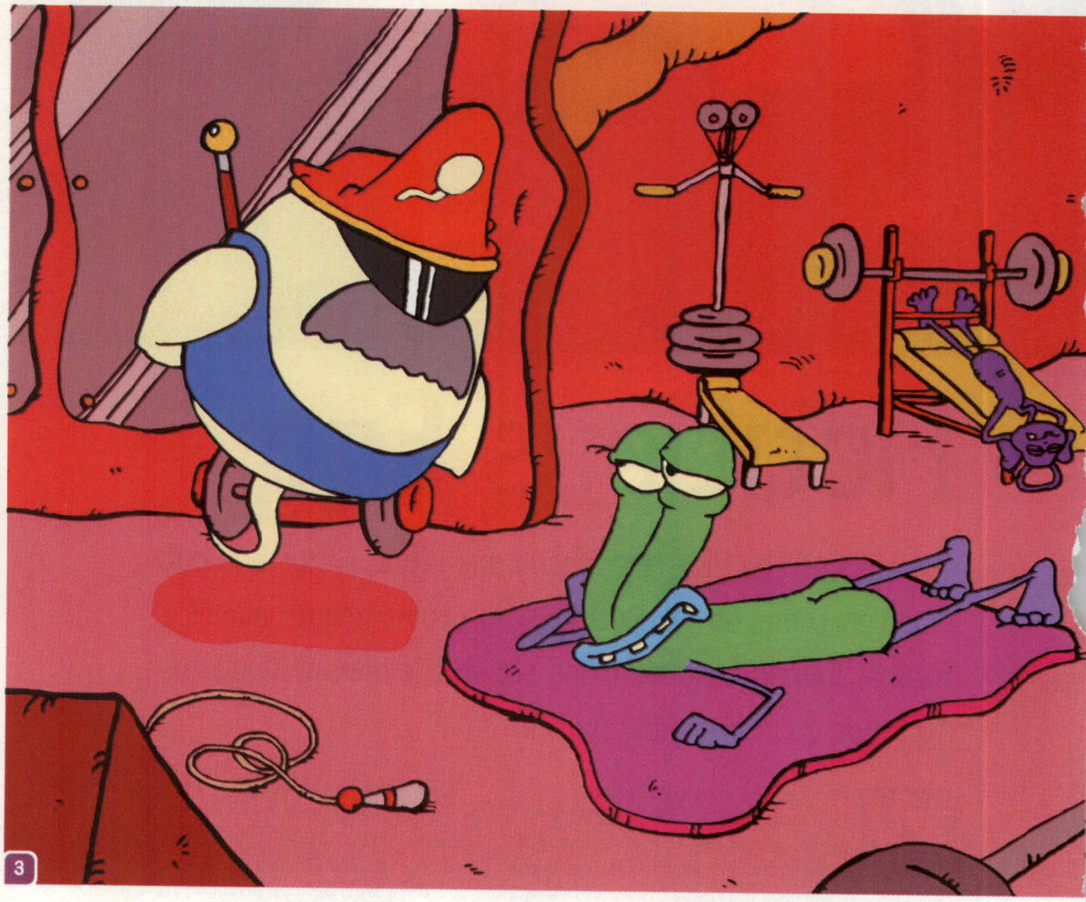

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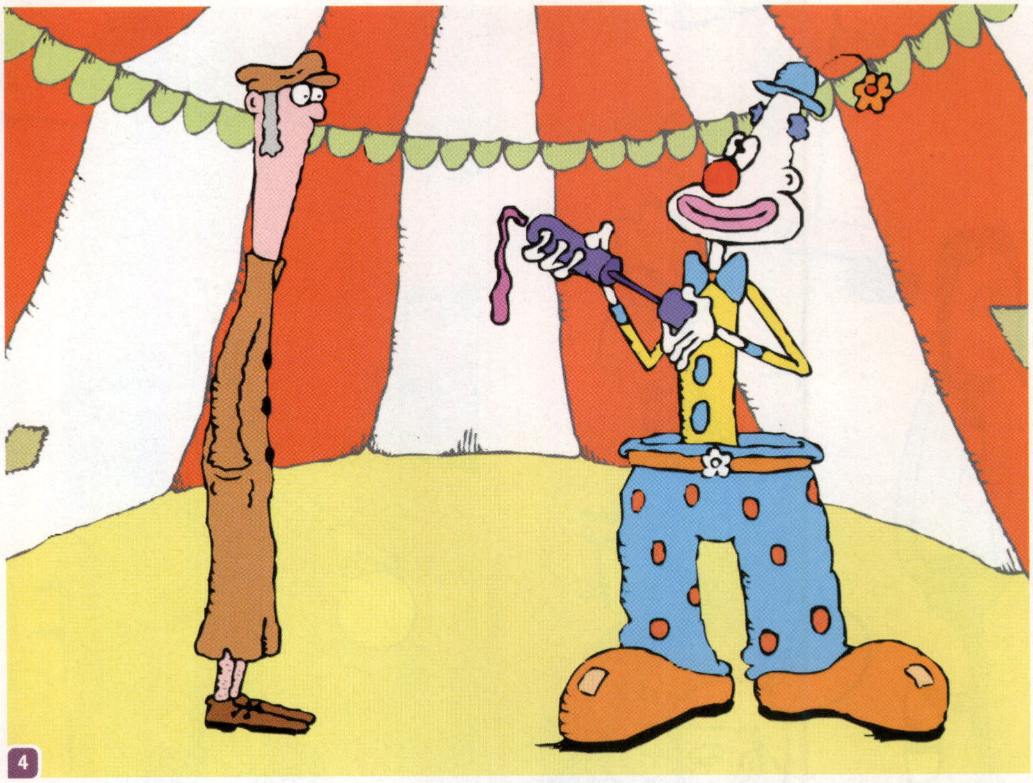
1. Co-produced with Lough House Animation, Sid Sidesplitter is a kamikaze cabaret star who featured in the first UK series to air on Atom Films. The series is still running - take a look at **[w]** www.atomfilms.com/default.asp?film_id=139.

2. Another new project, *The Swear Bears* is a series for adults and teens. "It's about Daddy and Baby bear after Mummy Bear has left because of the 'Goldilocks incident'..." It's primarily for the Web, but will be animated with broadcast production values for future airings on TV. The series was written by David Stevenson, and is at this moment being pitched to broadcasters.

3. This is Floyd Luteo, an animated compare who introduces the comedy zone on Granada's entertainment site. The series was co-produced by Tiny Idle Hands and written by Marcus Evans in 2000, and is still running. Tune in to watch Floyd's bi-weekly stand-up shows at **[w]** www.g-wizz.net/floydluteo/



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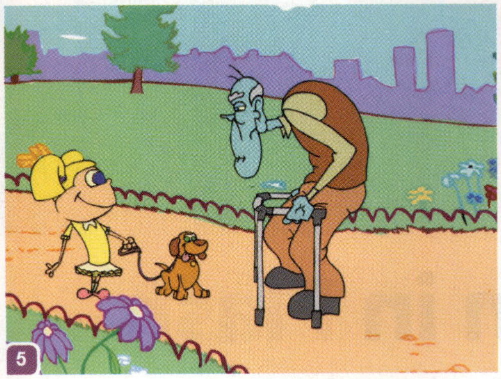
4. Meet Tommy Sausage, the Web's most talked-about sex pervert. "It's now considered a vintage Webtoon," says Andy. The cartoon was Fictitious Egg dipping its toe in the waters of online animation. "We couldn't get any sponsorship, though, as no-one understood the Net and no-one wanted to put money into a sexual deviant!"

5. *My little Puppy* is a project in the early stages of development. Intended for a Web audience, it is about a little girl's puppy that has disturbingly violent tendencies. "The pilot episode can be seen on our Website, but we don't really know what's going to happen to this yet… it's early days."

6. This is Fuzzy Duck, a critic who reviews films, books and restaurants from his barstool. "The site we developed him for went bust, so he's never seen the light of day, but we like him and hope we can get him on another site soon. He's a bit of an Alf Garnett-type character, and is designed to be animated quickly so he can be updated daily."

7. This a scene from the second series of *Beastly Behaviour*, produced in 96, about the sexual antics of the animal kingdom. "It was originally made for a show called *LustFaktor* in Germany, which is like an adult *Blind Date*," Andy tells us. The series was broadcast in around 25 countries worldwide, and was later released on video with an 18 certificate – unusual for animation in the days before *South Park*.

8. This still is taken from 'The Gerebil Episode' of *Celebrity Freakshow*, a 52-part online series made entirely in *Flash* for doomed entertainment site Switch2, featuring celebrities as you've never seen them before. It's best not ask where Richard Gere is about to put the gerbil…



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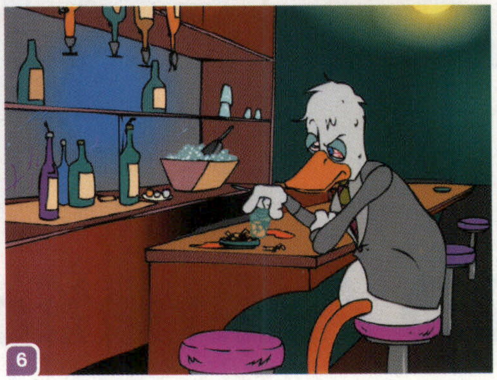

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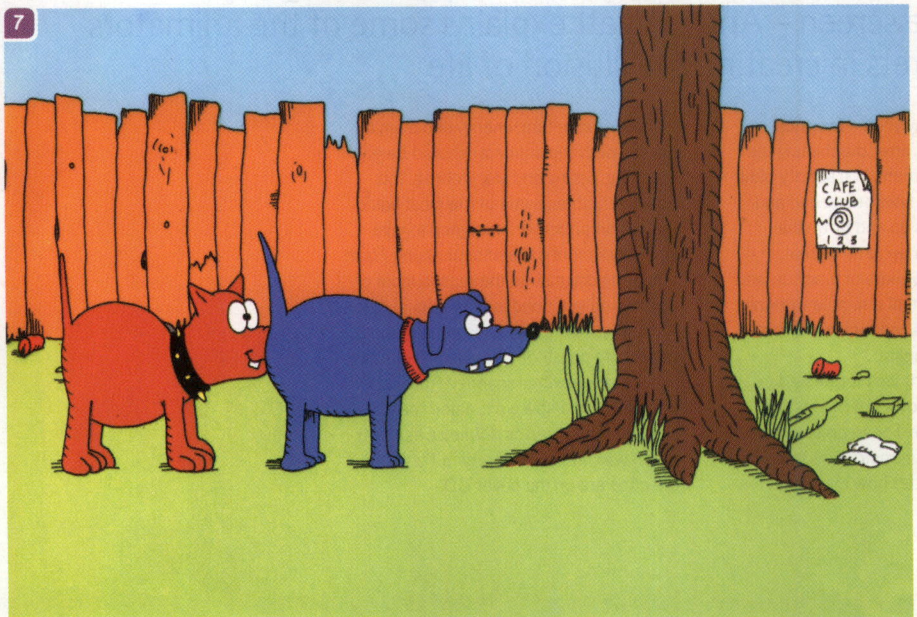

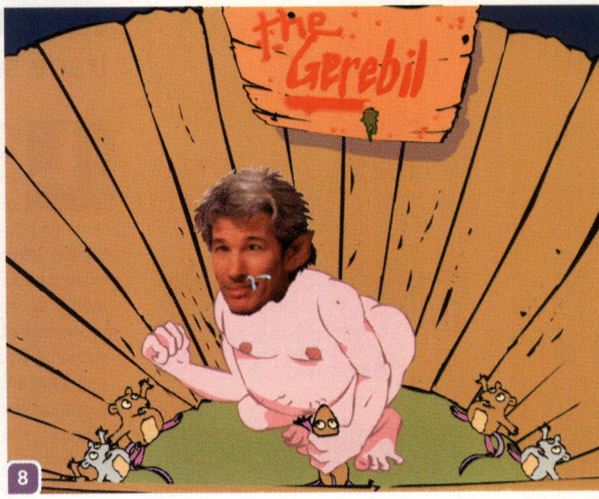

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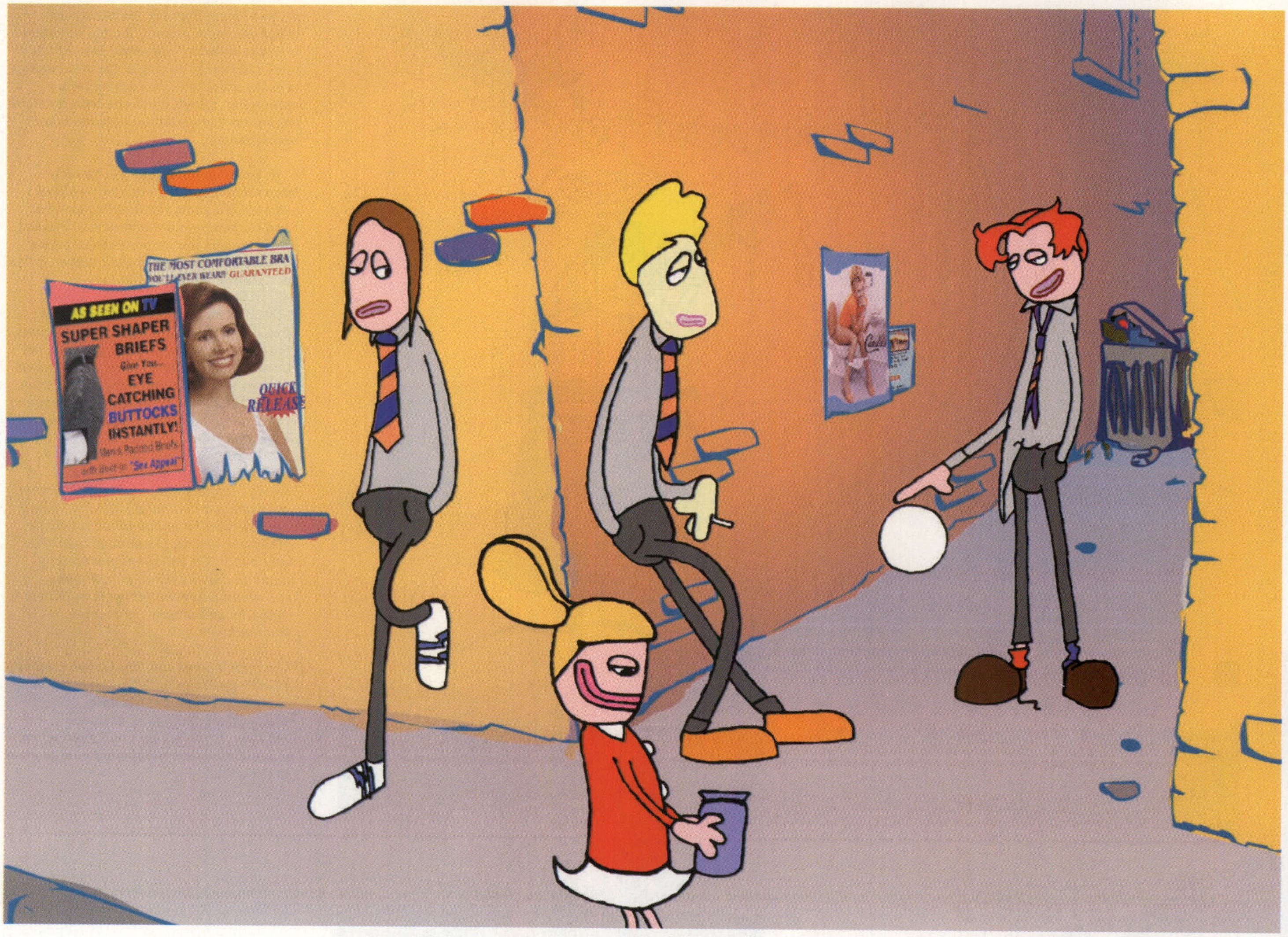
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2D Animation in Flash

There is far more to animation than simply moving objects across the screen – Andy Wyatt explains some of the animators' trade secrets in creating the illusion of life

Let's say you've bought a flute... after purchasing the instrument, you simply blow over a hole at one end and move your fingers up and down the outside. Wrong, to become a great musician can take years of practice, and yet it is accepted that a simple working knowledge of *Flash* endorses the title of animator. Wrong again.

A good animator isn't interested in making objects move, but in making objects come alive. For an object to move convincingly, the animator needs to give the object (no matter how mundane) weight, momentum, energy and even a personality. The animator should be good at timing, acting and storytelling. This tutorial outlines some of the most basic animation principles designed to give your work more life and soul. Using *Flash* can bring drama into the most simple of actions: all you need is a few bits of text.

Finally we'll go through some of the aspects to consider when using your own animation drawings scanned from paper into *Flash*, and how we created the lip sync for the TV series *Johnny Casanova*, which was created entirely in *Flash*. All the clips are on the cover CD.

Expertise provided by Andy Wyatt
[e] andy@eggtoons.com
[w] www. eggtoons.com.
Flash 5 is available priced £259,
[t] 020 8200 8282, or go to
[w] www.macromedia.com/flash

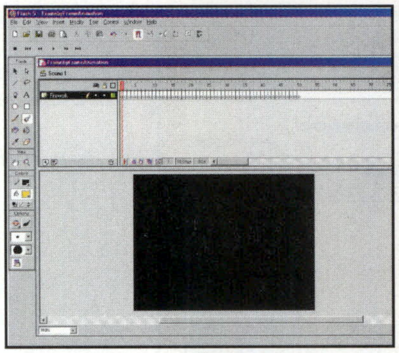
Tutorial files are on this month's cover CD in the **dual\tutorial\flash folder**.

Part 1: Frame by frame animation

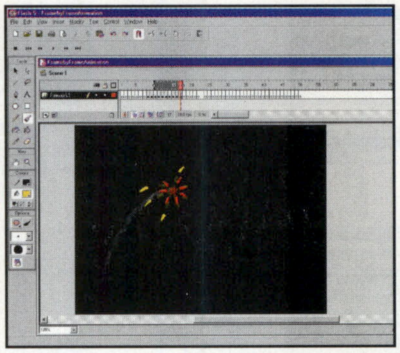
The simplest but most rewarding and fun way to improve your animation timing skills

Graphics tablet

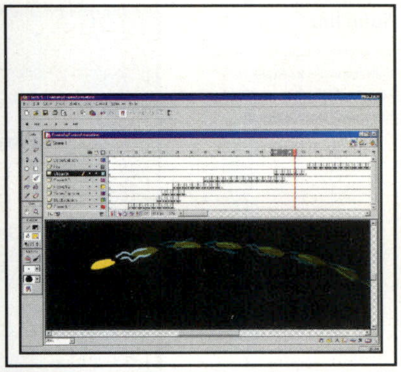
Although perfectly good results can be achieved with a mouse, serious animators should consider using a graphics tablet and pen. You'll never look back!



1 Most animation is easier to do with the Edit>Preferences set to Flash 4 Selection Style and Flash 4 Frame Drawing. Create a layer of blank keyframes [F7] as shown and click the playhead on a keyframe you want to start the animation. For best results the movie frame rate should be set between 12 and 25 fps.



2 Switch on the onion skinning. As soon as you draw something, the keyframe will turn black and using the keyboard [> or <] you can scroll through the frames with your non-drawing hand. You'll soon build up a sequence of spontaneous animation. Any mistakes, hit Ctrl/Command-Z [Undo]. Create a new layer for each new animation.



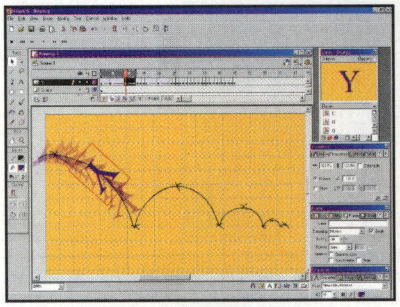
3 We've done a quick firework display for this piece, but you can be as abstract as you like. The whole point of this exercise is to get a feeling for timing, and animating shapes and patterns mean you are not restricted by complicated drawings. The results should be raw but refreshing.

Part 2: Creating weight in objects

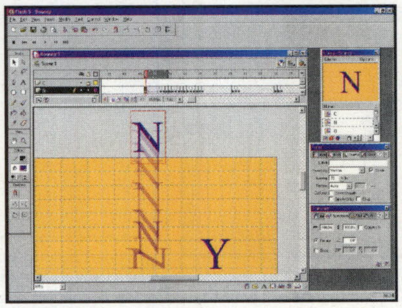
How to give your animation life and soul using the most basic of objects

Frame by frame

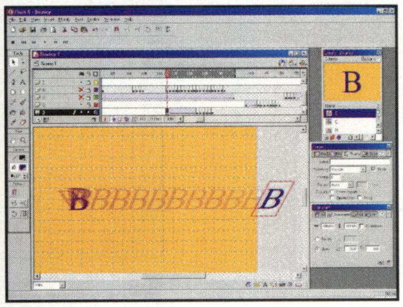
To see these principles in action, study animation by watching a video frame by frame and seeing how the animator distorts certain frames to get the most out of the action.



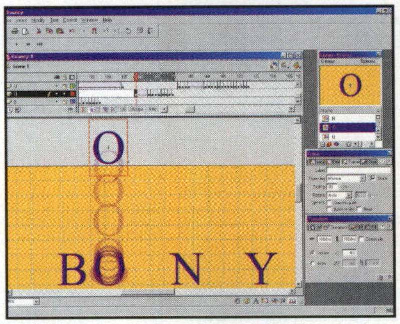
1 For the bouncing 'Y' draw a rough guide on a separate layer for your animation to follow. Note that this isn't a 'guide layer', it is just to help you establish key points. Create keyframes at crucial points in the arc and adjust the easing of the tweened sections.



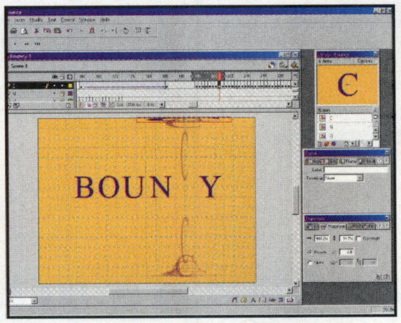
2 The 'N' drops straight down and bounces slightly on landing. Use the easing to accelerate the falling object as it gains momentum between the two keyframes. Squash the object slightly upon landing using the Size tool, to disperse the energy that would build up in a real falling object.



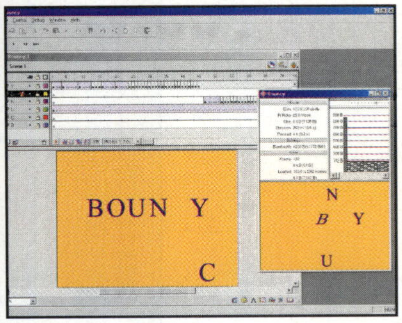
3 If an object needs to move quickly, create the illusion of drag by skewing the object in the opposite direction of movement (Transfer panel). The faster the movement, the greater the skew. Create a believable stop by dampening the skew frame by frame.



4 We have deliberately made the 'O' appear heavier (like a bowling ball) by using less bounce on landing. Always imagine how heavy the object you are animating is, because this affects the animation. Also, think about the properties of different materials, eg: a bowling ball or a softball.



5 The faster the action the greater the stretch (momentum) and squash (energy dispersal) should be. The 'C' in this example has been widened by over 400 per cent and flattened by 14 per cent, distortions that are not obviously apparent when viewed in real-time.



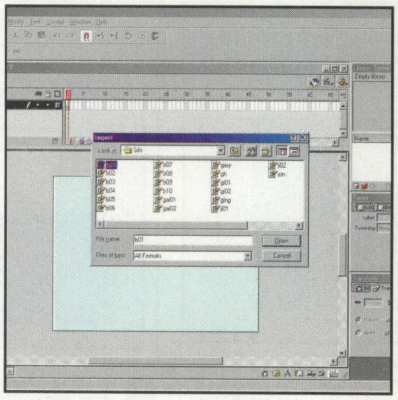
6 By using a combination of tweening and frame by frame animation, you should be able to make your object animation more interesting without greatly increasing the size of the file. Although the tween function has its uses, it should be used sparingly. ➤

Part 3: Using scanned drawn artwork in Flash

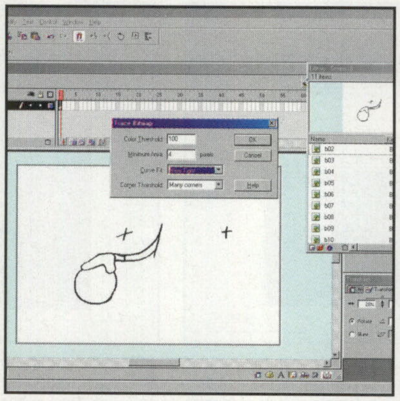
If you want your animation to look more personal, why not scan in some of your paper drawn artwork?

Solid line

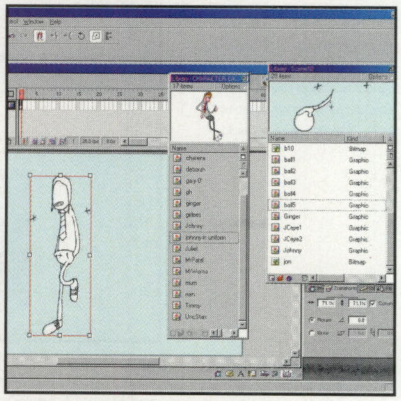
You will find it easier to trace your drawings in black pen before scanning. This will ensure *Flash* has a solid line to work from.



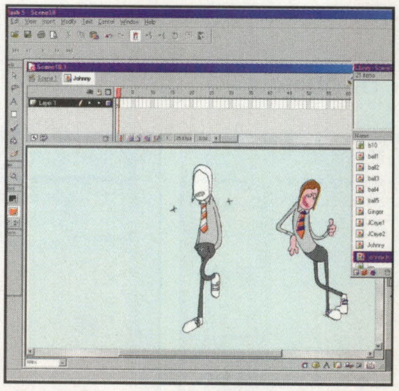
1 Scan your drawings into an image manipulation program, clean them up and save as GIFs to keep the file size down right from the start. Import the GIFs into *Flash*. If *Flash* recognises a sequence it will ask if you would like to import them all.



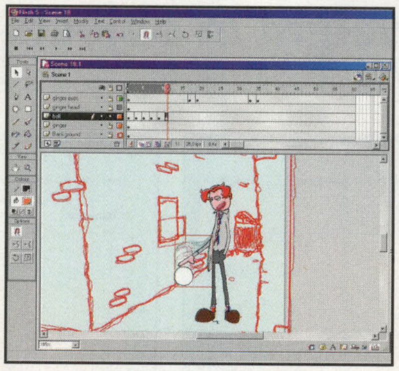
2 All the elements in the library are bitmaps, so before you can add colour and animate them, they all have to be converted to a vector. This is done by selecting the bitmap, then Modify>Trace Bitmap. Experiment with the Trace Bitmap properties to suit the required style.



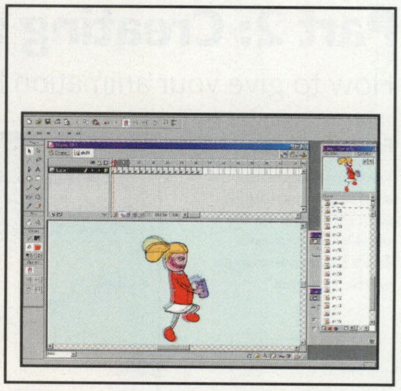
3 Convert every vector image into a symbol, and file in the library. To colour the image, choose the Paint tool, or open up a reference colour model library prepared earlier (which we recommend to ensure colour continuity throughout the animation). Select the colours using the Dropper tool.



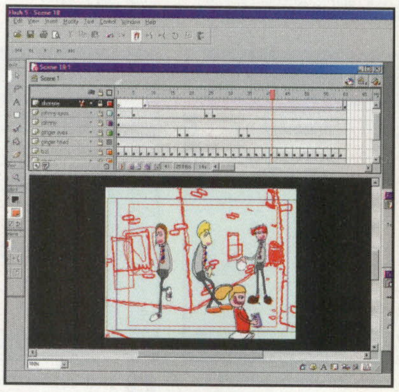
4 If the drawing was cleaned up well, it should be easy to paint. Gaps in the line will have to be repaired using the Brush tool. If there are elements of the artwork that need registration, it is advisable to put small registration marks on the original artwork.



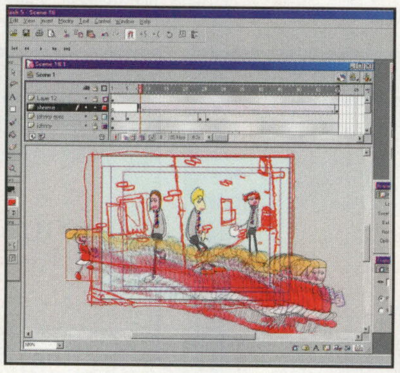
5 Start building up the layers of animated elements into their final positions. Use the onion skinning to ensure all the elements are registered and animating correctly. Because each element of the animation is a symbol, it can be freely manipulated and you can apply all the available *Flash* effects to it, if required.



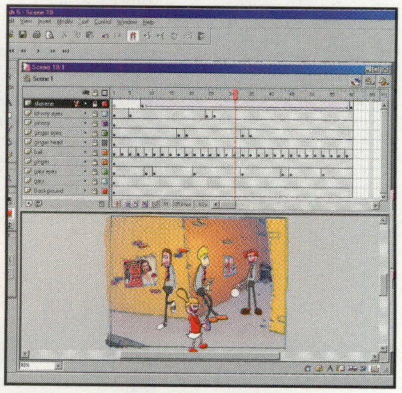
6 For 'cycling' animation such as a walk, runs and so on, create a new symbol and put the cycle within it. In these circumstances, it is better to keep the Symbol Behaviour Properties as a graphic as opposed to a Movie Clip, even though the symbol contains moving animation.



7 If you intend the animation to eventually be on TV/Video, make a TV Safe mask to ensure that none of the animation will be cut off. Any titling should be well within the red area. There's a TV cut-off mask on the cover CD.



8 For the cycling animation to pan across screen, create two keyframe points either side of the frame and tween. If, as in this case, the animation is getting closer to the camera, the second keyframe should have the final symbol position enlarged. Check using onion skinning.



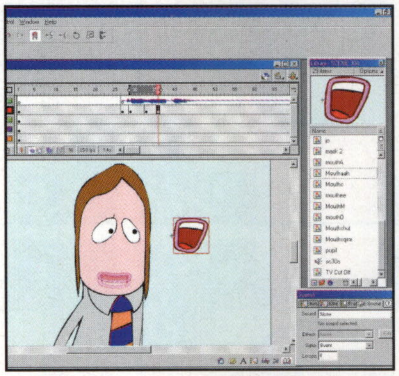
9 With all the individual elements composited, including the background, the scene is now ready to have music and sound effects added before being edited together with other scenes of the final animation. The TV Mask layer can be deleted.

Part 4: Lip Sync

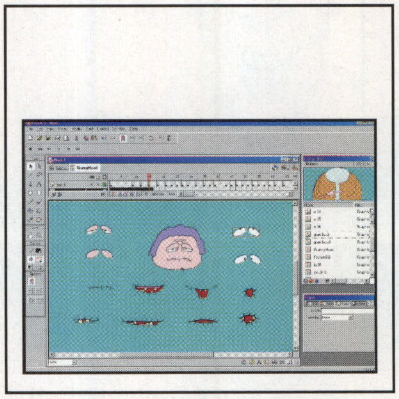
If you want your animation to look more personal, why not scan in some of your paper drawn artwork?

Cartoon animation

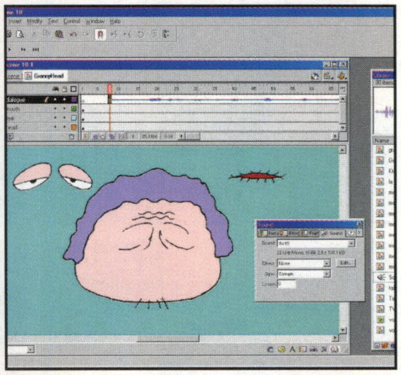
To learn more about animation lip sync, read *Cartoon Animation* by Preston Blair. Quite possibly the most useful book you will ever read.



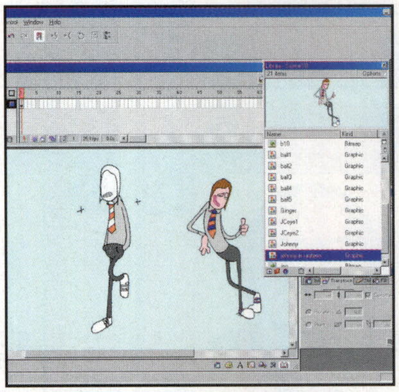
1 If done well, lip synchronisation can add a lot to your animation, and is very Web-friendly because only a small number of individual elements are required. Most characters would require between six and 12 different mouth positions, for the major mouth movements.



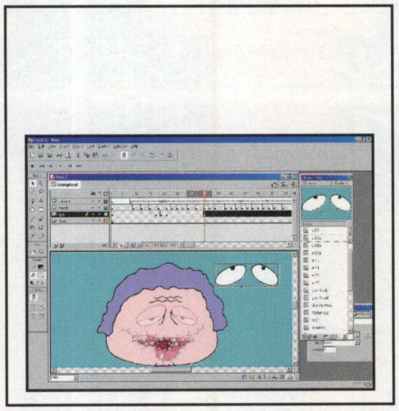
2 Here we can see all the required elements for successful lip sync. For added effect and expression, the eyes should be kept on separate layers too. Scan or draw your mouth positions in *Flash* and label them logically in the library.



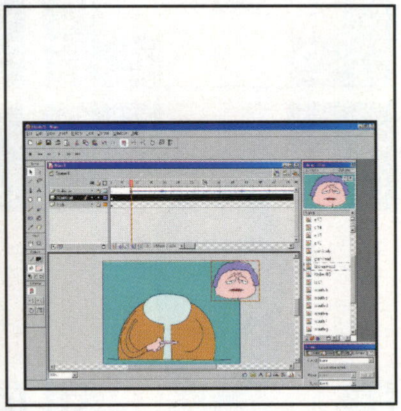
3 Create a new symbol and call it 'talking head' or similar. Import a sound file into a blank keyframe and layer at the point the dialogue should start. Short chunks of sound will work better than one long clip. Set the Sound panel Sync Properties to Stream.



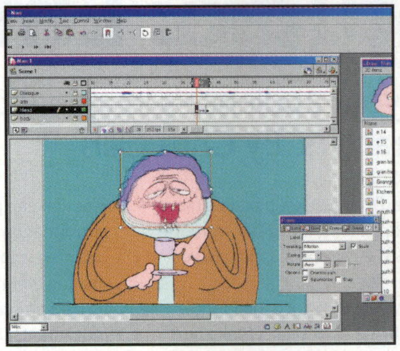
4 With the Sound Properties on Stream, you can hear the sound as you scroll. Select the point where, to the best of your judgement, the sound changes and insert a blank keyframe. Drag the most suitable mouth position for this sound from the library and position using onion skinning.



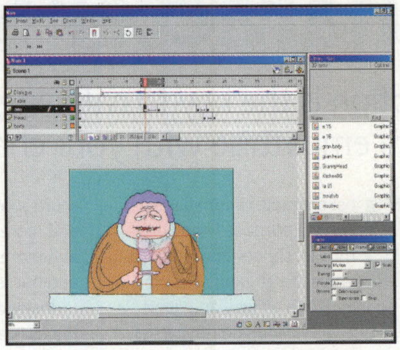
5 With the lip sync finished and tested, ideally on different machines to ensure you are in sync, complete the facial animation by animating the eyes to match the expressions in the dialogue. Delete the layer with the dialogue in.



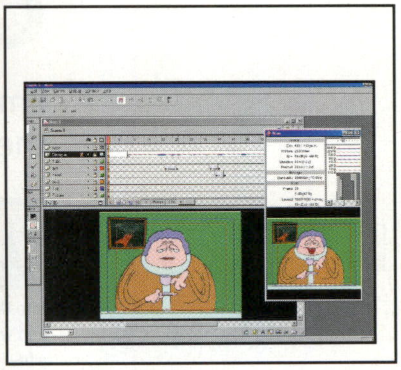
6 Return to the main scene. Your lip sync sequence will appear in the library with a Play button. Insert this symbol into the scene. Create a new layer and drag in the sound file from the library, making sure you put it at the right keyframe.



7 To add movement to the head for even more interesting animation, you can enlarge, reduce and rotate (even skew and add effects should you wish) the symbol without affecting the lip sync animation. The keyframes can be tweened in the usual way.

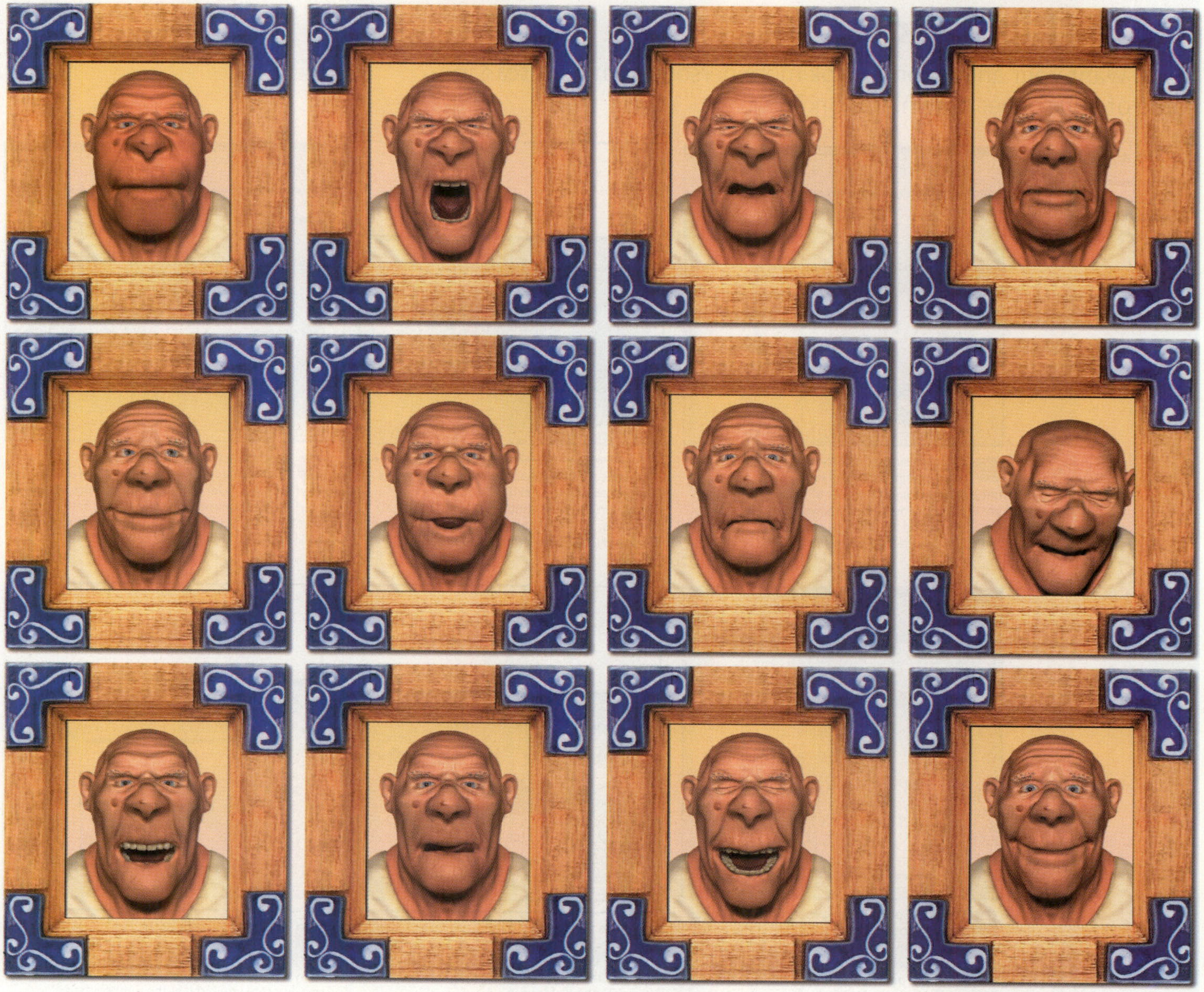


8 The secret of 2D *Flash* animation is to have as many layers of separate elements as possible, and then everything can be animated independently. For added interest, Granny's arm, which is just one drawing, raises towards her mouth and down again.



9 Finally composite the remaining elements of the animation on to their relevant layers and test, not forgetting to check the TV cut-off if you want it to go on video. Always keep your symbols and layers clearly labelled for future tweaking.

Illustration: Bill Fleming [e] CHAOS3D@aol.com [w] www.komodostudio.com



Character Studio: Emotion

Emotion is the key to catching your audience's imagination and making them empathise with your characters. By Chris Ollis

Expertise provided by Chris Ollis, [e] chris.ollis@vega.co.uk. *Character Studio 3* is available price £1169 (upgrade £464) from Discreet, [t] 020 7851 8000 [w] www.discreet.com. There's a fully functional, 15-day demo of *3ds max* on this month's *Computer Arts* cover CD, issue 57, on sale 17 April.

The files for this tutorial are on the cover CD in the dual\tutorial\Character folder.

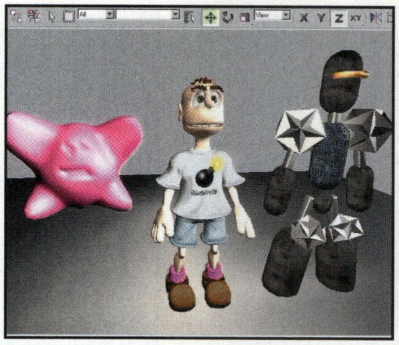
Most character animations serve a purpose – the hero runs in, shoots the bad guys, grabs the girl and runs off into the sunset. That's all well and good, and with some well-arranged run cycles, a few dodges and dives, the right lighting, some quality sound effects and some incidental music, the results can turn out to be very impressive. But to make it work really well, you need to be a bit more subtle. Don't just keep adding more and more explosions, decapitating more and more bad guys, and slapping in yet another lens flare!

Instead, what you want to do is show the danger in the hero's face. Make him wince from the pain of the searing laser bolt, see the damsel swoon with relief as she is swept up into his big strong arms and laugh as the bad guy gnashes his teeth in fury at his defeat.

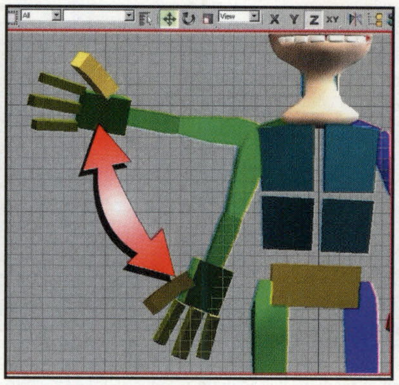
Emotion can play an major part in making an animation great. It's the key to catching your audience's imagination and making them want to see more. *Toy Story* thrived on scenes with barely any movement, just simple facial expressions: whether they were for comic effect, despair or a show of love, they gave the film life. That's why so many people loved the film, and that's what you're going to learn to add now.

Part 1: Setting up

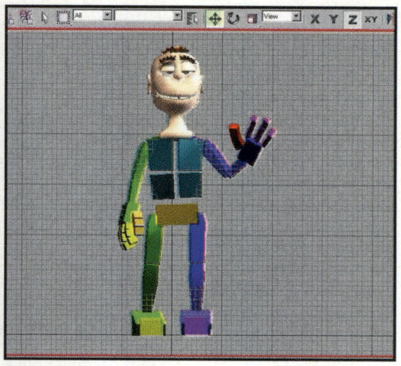
Morphing between pre-built facial expressions using *max 3d*'s Morpher Modifier



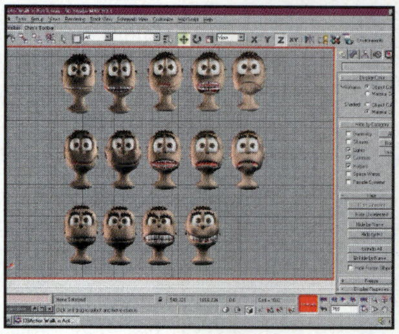
1 The way your character looks and behaves will influence the way you set it up. Depending on whether it's a human, a pink blob or a giant robot, you'll need to vary your use of bones, FFDs, simple kinematics or whatever. So think of what you are dealing with and how you are going to deal with it – there's nothing worse than getting halfway through your animation and realising that your links are wrong or holes are appearing!



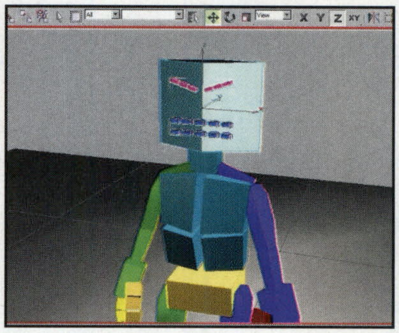
2 We'll assume that you are fairly competent at setting up a character for animation and that moving arms and legs, adjusting keyframes and general motion is within your grasp. If it isn't, don't worry, this tutorial might still help you along the way, or at least give you ideas to use in other areas of animation.



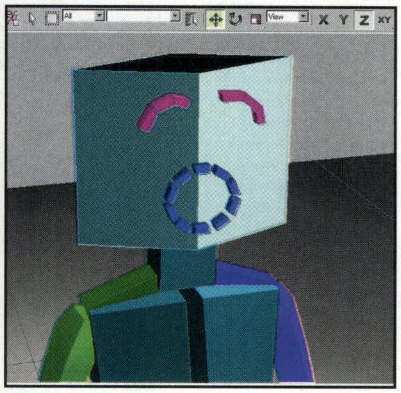
3 We'll be working with a simple cartoon character with a bone structured body and a series of pre-built facial expressions which we'll morph between using *max 3d*'s Morpher Modifier. If you have a similar model of your own, dig it out now, or better still, build one! Practice makes perfect. Any differences between models shouldn't affect the validity of this tutorial.



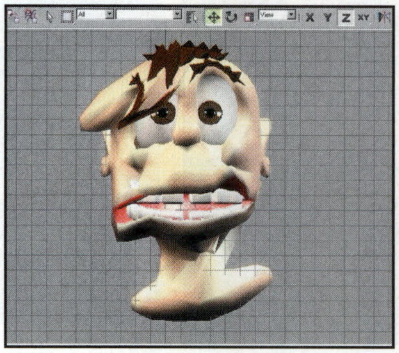
4 We will cover the basics of displaying happiness, sadness and anger, so we'll require a selection of faces to represent these. To get an idea of what you'll need, open the file 'faces.max' to see meshes or 'faces.jpg' to see a picture demonstrating the various stages. Alternatively, if you don't want to make your own, implement this head on to your character's body.



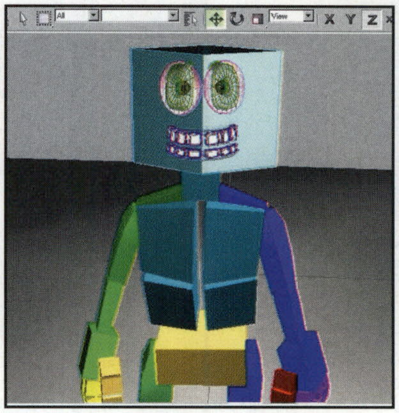
5 A morphing head isn't the only option available. Many animators use one out of habit, but also because they prefer the organic feel of the morph transition. If you would prefer, and are well versed in the art, build a bone structure for the face that can be incorporated into the body's skeleton. This way you can join the head to the body and not worry about sudden decapitation!



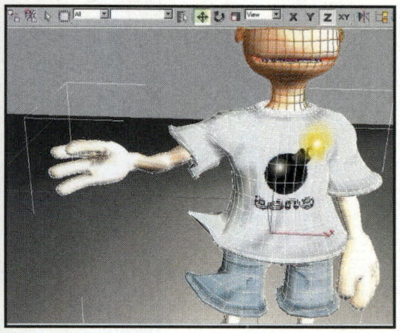
6 If you are using facial bones, make sure you have enough to create the shapes in the files mentioned above: a smile, a wide open mouth, raised eyebrows, 'O' shape of the mouth, cheek movement, eye opening and squinting.



7 If you are creating your own morphable head, we're sure that you are aware of the need to maintain identical pivot points, vertex counts and alignment between all of your targets. Failure to do so will result in the head not appearing in your Morpher Selection window or else it'll turn inside out when you try to make it smile!



8 For the eyes, eyelids and teeth, we'll use separate objects linked to the head to allow easier hands-on manipulation, for quick and easy blinks, eye movements or dental rearrangement.



9 Finally, before we get to the actual specifics, test your model. Bend his arms and legs, morph between expressions or move the facial bones. Try and do everything possible to make sure that it all works and isn't going to fall apart halfway through. Vertices linked to the wrong bones can be a nightmare to identify and fix, so if you have to do some fixing, get it done first. ➤

Part 2: Happiness

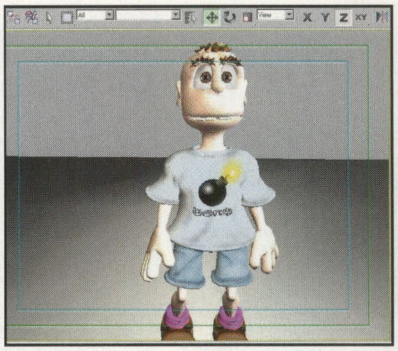
Surprise, a dawning realisation, the silly grin – they're all ways of expressing delight

Keyframe transitions

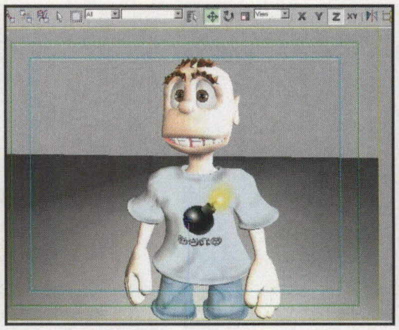
Be careful to keep an eye on transitions between keyframes, especially in the facial animations. If a bone or a morpher transition is first animated at frame 60, an initial keyframe will be generated at frame 0, creating a transition throughout the first 60 frames of the animation. This can seriously disrupt your character's intended expression. To fix such problems, spend some time in the Track view checking, pulling and pushing your keyframes about until they are where you want them to be.

Subliminal acting

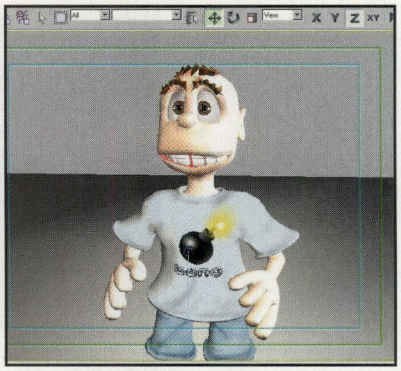
The transitions mentioned in the tutorial can look a bit stilted. Once you've finished animating, go back and add some subtle, random movement between the main keyframes – a 2 degree twist of the hips here, a slight lift in posture there, a tilt to the head and so on, to give a far more natural and fluid look to the movement. Keep the movements small, you don't want your character to start breakdancing halfway through an emotional appeal. Also be careful not to destroy the keyframes of animation that you've just spent all that time on!



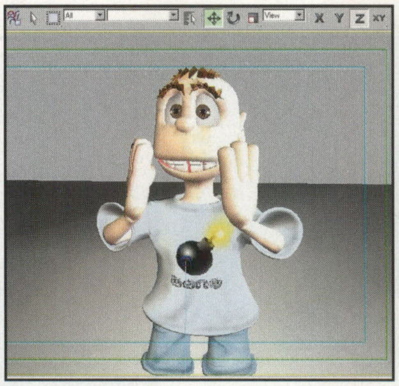
1 Starting from a base pose (arms by side, looking forward but relaxed) we will animate a character becoming more and more happy. We will run through facial and body movements that can be used in any 'happy' scenario although in this case we'll pretend that someone has walked in with a birthday cake!



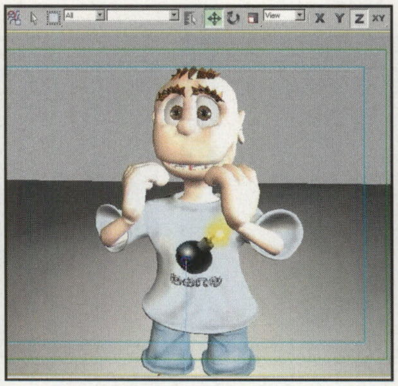
2 Jumping right in, go to frame 5 of the animation and using the morpher, or your facial bone structure, transform the character's face into a startled expression: raised eyebrows, eyes wide, mouth slightly open. The rapid transition (five frames running at 30fps) emphasises the shock involved. Also, raise the shoulders slightly – subtlety is the key here.



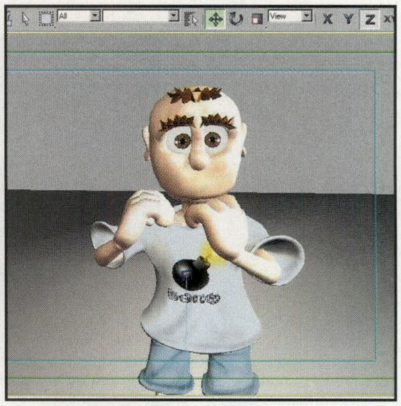
3 Frame 20. Move the hands up to just above waist height – this is a standard, subconscious, defensive movement. It adds subliminal action to the scene and keeps things moving nicely. It also underlines the speed of reaction with the body, catching up with the face's rapid response.



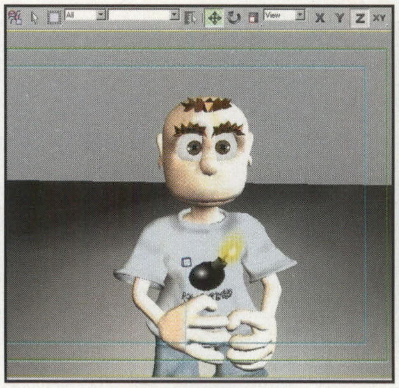
4 Frame 40. Move the hands up to either side of the face with the fingers outstretched. As this happens, increase the amount of smile in the morpher/bones to 50 per cent. The mouth should still be open from the initial shock, but showing definite signs of happiness.



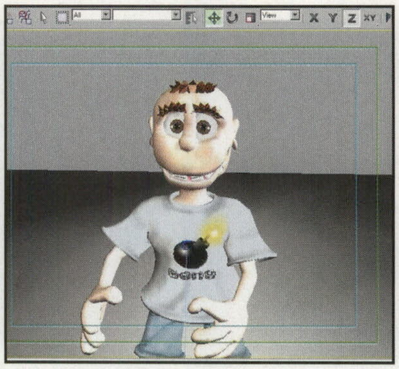
5 Frame 60. Drop the Shock value further and raise the smile. It should deform the cheek area a bit, adding lift and as a result, a 'smile' to the eyes. The character is now fully aware of the situation. Lower the hands to below chin level and loosely clench them.



6 Frame 80. Slightly embarrassed by the initial reaction, the character will become shy, and turn the head to look away a little. The mouth should be completely shut now with a full smile. Throw in a couple of blinks to add emphasis.



7 Staying with frame 80, drop the hands to the waist and roughly animate the fingers to create a sense of fumbling. Continue this fumbling for 20–30 frames. Our character is becoming caught up in the moment and subconscious reactions become necessary.



8 Frames 100–150. Overwhelmed with joy, the character now starts to swing from side to side, with the arms caught up in the motion. The head however stays focused and faces the target with far less deviation despite the full body movement. The facial expression should be a full-on, beaming, ear to ear smile.

9 Save and render. If you want to continue implementing it into a scene, bear in mind the character's emotional traits. A certain buoyancy or lift to the walk cycle, an ongoing clumsiness because its attentions are elsewhere and obviously a smile in the face of all adversity! An animation of the character running through these stages and more can be found on the cover CD.

Part 3: Sadness

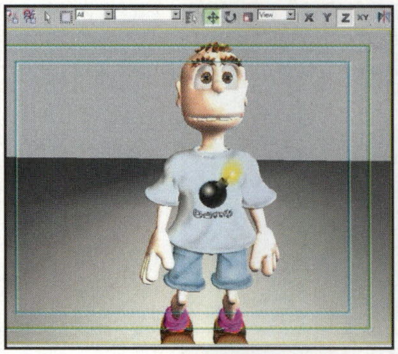
Slow gestures and a sense of timing are the keys to creating a sense of sorrow in your scene

Watery eyes

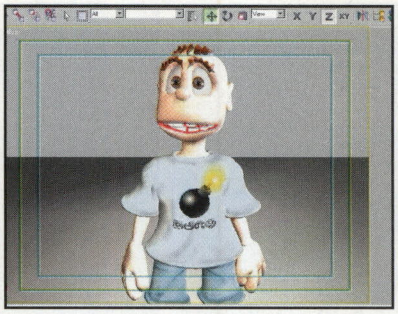
For that extra touch, increase the Shininess of the character's eyes (adjust the material's Properties) raising the value as they get closer and closer to crying.

Subliminal acting

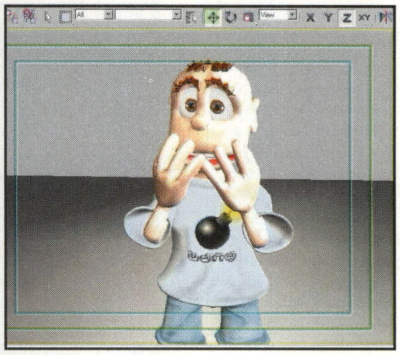
Once again, this is very important. To add realism to your characters, keep them moving – subtle gentle swings of the arms, a sway to the hips, a glance away, and so on. Implement them throughout your animation for brilliant results. But be careful not to overdo them and detract from your scene.



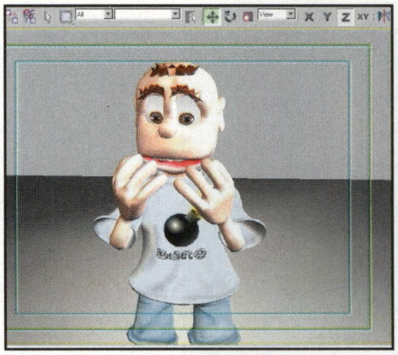
1 Go back to frame 0. Delete all the new keyframes because we are going to start again from scratch and create some characteristics for sorrow. Implementing these can add depth to your character and really make the audience emphasise with them.



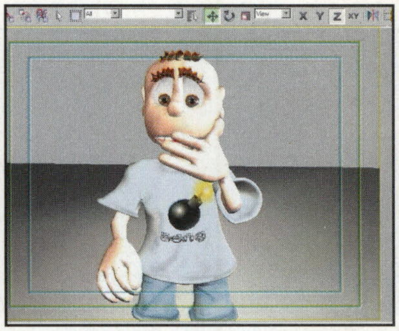
2 Once again, we will leap in and startle the poor chap. The sadness is derived from a sudden bit of bad news. So at frame 5, we want a morph to or facial bone animation of shock (raised eyebrows, open mouth). Add to this a raising of the head slightly as if your character is sitting bolt upright and paying attention to someone barging in with the news.



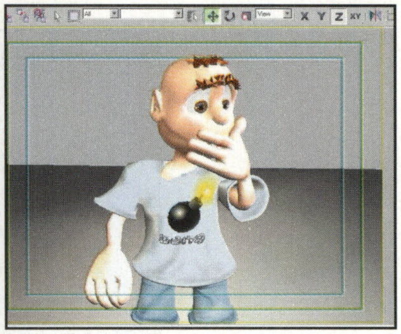
3 Frame 20. Again, the body reacts slower than the face so the 0–20 transition here will help maintain a visually natural movement. Raise the hands up again with outstretched fingers, but this time have them just cover the mouth up, almost as if the character is about to sneeze.



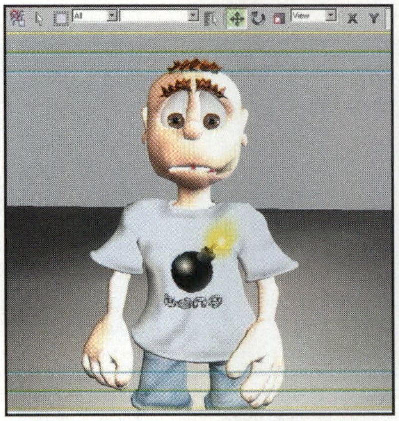
4 Frame 50. The fingers curl slightly and the hands drop to chin level as the head tilts downward. The eyes start to look downward as realisation kicks in. The 30 frame transition for the small movement helps emphasise the severity and sadness of the situation. The character is clearly stunned.



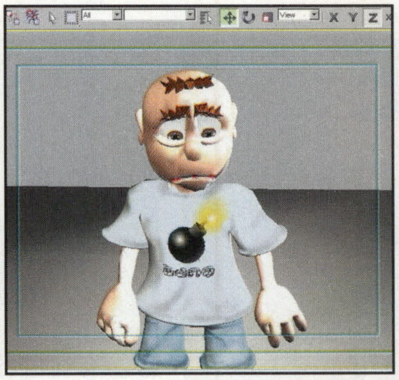
5 Frame 80. Raise the head back up to a level state, but now morph in or twist your bones to create a frown, raise and bring together the inside ends of the eyebrows (above the nose). One hand at this point should drop down to about waist level, while the other rises again to gently cover the mouth. For a subtle touch, raise the shoulders slightly to show a deep, controlled breath.



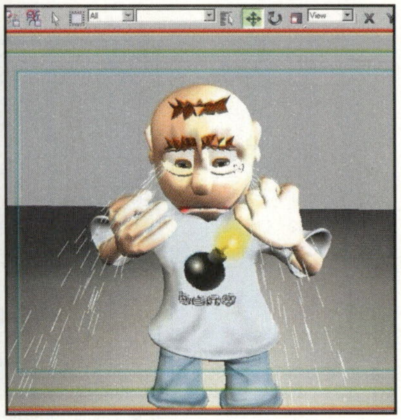
6 Frame 100–130. Close the mouth with a hint of downward curl at the edges. Turn the head to the side, taking care to keep the hand over the mouth all the time. Slowly close the eyes and keep them shut for a second before slowly opening them again. As the eyes shut, very gently shake the head side to side, but only by a couple of degrees.



7 Frame 150. Turn the head back to face the camera and drop the hand from the mouth. Here we reveal the complete morph/bone transition of the mouth to the sad, downward turned state. The frown should also be more intense with slight closure of the eyelids to create a squint.



8 Frame 170–200. Drop the head forward and start to shake the head from side to side, slowing to a gradual stop. At the same time, animate the chest, moving up and down as it breathes heavily. If you can manage it, put in a shudder – a deep breath followed by a slight shaking up and down as the chest lowers to the exhaled state.



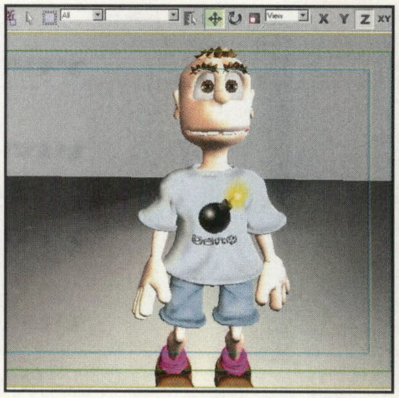
9 If you really want to go to town and have your character break down, why not have him throw his hands in the air, with his head back and mouth wide open, wailing. If you're feeling particularly cartoony, use Particle Systems to create tears flooding from his eyes! ➤

Part 4: Anger

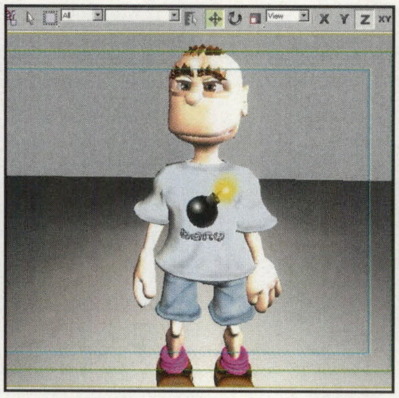
Create drama by conveying a barely contained feeling of rage in your character...

Keyframe loading

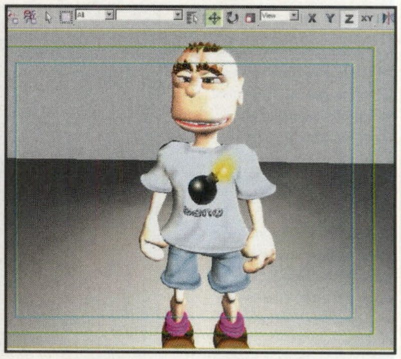
For repetitive motions such as breathing, swinging arms or blinking, open up the Track view and identify the areas. Select the keys involved, making sure you grab the start, middle and end of the transition. Now hold down Shift and drag the keys along the Track view to a new area – where you want an extra blink – and release the mouse button. So long as you are careful, you can happily grab multiple keys on multiple objects to loop several things at once.



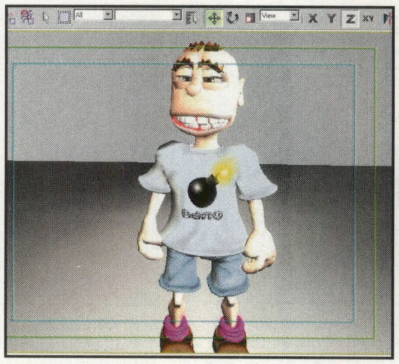
1 Once again, let's go back to the start frame, with the arms by the sides, and the face relaxed. This time, we'll annoy our character – perhaps someone will knock over a house of cards he's been building for the last four hours!



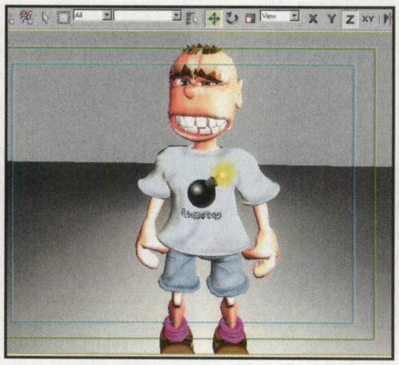
2 Frame 5. The head reacts to the sound of falling playing cards! Turn the head to face the source of the problem and morph in or move your bones to make him frown/scowl a little. Close the eyelids slightly to make him squint a bit.



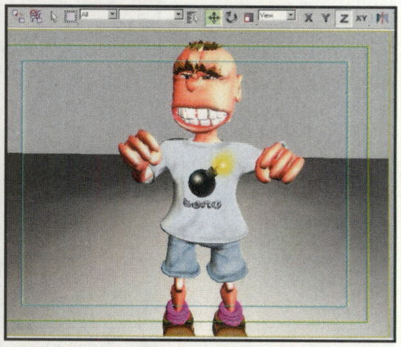
3 Frame 20. He's realised what's happened and it's well and truly caught his attention! Puff up the chest, raise the shoulders and clench those fists. Open the eyelids a little to give him scary, twitchy eyes! If you can, animate the arms so that they wobble slightly at his sides. This emphasises the tension in the arms.



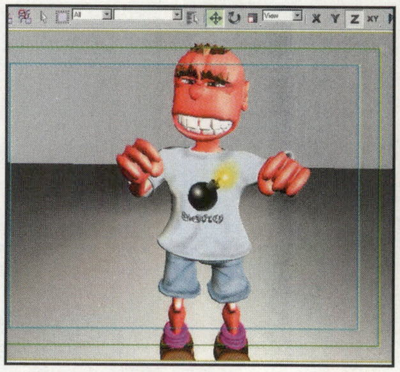
4 Frame 50. Breathing deep and hard now (chest up and down) raise and lower the shoulders in time with the chest movements and increase/decrease the tension of the clenched fists in synchronisation with the body movements. Again, twitch the eyelids a little, making sure the target is still receiving the scary look.



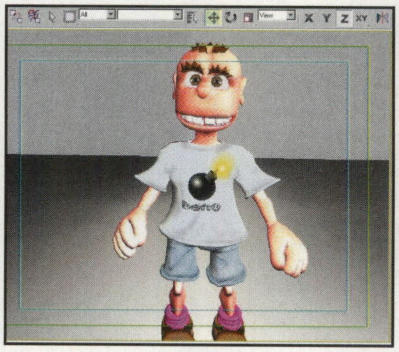
5 Frame 80–120. The final cards are hitting the table now, so we'll go to town a bit. Bulge the eyes slightly and animate the skin texture to show a flushing of blood to the cheeks/head! Keep the breathing, hand clenching and shoulder movements going. Track view and Shift-drag the keyframes you've already created to make a looping routine.



6 Frame 120–150. The vitriol is rising and so are his fists. Raise the clenched hands up to chest height and open the mouth slightly. Don't open it too far: just want it enough to show a glimpse of clenched teeth. Try and carry the shaking arms over to the whole body, so that he looks as though he's vibrating slightly. Make the viewer think he can't contain his rage.



7 Frame 150–180. Open the mouth a little more, and if you like, move the teeth a little from side to side, grinding them slightly. Keep the shaking going, until suddenly – and the speed of transition is the important bit – turn the head away, unclench and drop the hands to waist level, but maintain the heavy breathing chest movements.



8 Frame 180–200. Regaining control now, while looking away, shake the head from side to side, slowly decreasing the amount as you slowly turn the character to face forward once again. As he turns, make him blink once very slowly. In fact, keep his eyes shut for a few frames before opening. Keep the heavy breathing going (Shift-drag the keyframes).

9 To finish, decrease the amplitude in the breathing, calming the character down and removing the anger from the face. Render your animations and adjust the timing here and there to suit. Maybe add a couple of subliminal movements. The important thing to learn from this is the ability to act without much movement. At no point did the character run around, jump up and down or drive a burning car through a building. But the animations turned out as eyecatching, if not more so. ca•s

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Strutting your stuff in Maya

Creating a character walk cycle in *Maya 3.0*

Creating a walk cycle is often one of the first steps taken when doing motion tests for a new character, learning new software, or showing off your character animation skills. Unfortunately, walk cycles are rarely given enough attention and refinement to make them appealing. The key to making a walk cycle come alive is to re-think your approach. Don't think of a walk cycle as a mere repetition where each step is mathematically exact and the motion curves are copied and pasted throughout the entire sequence. Think of it as a chance to show off your acting skills while your character moves from point A to point B. Breathe life into every movement and give your character an attitude. Motivation is an excellent place to start: why is it walking? Is the character exhilarated, horrified, or hysterical?

Characters with short legs take more steps than a tall character to travel the same distance. Bulky characters generally move slower and take large, heavy steps whereas a cute, cuddly character is more playful. In this tutorial, we'll explore setting up a walk cycle for a character using *Maya 3.0*. The skeletal structure is generic so it can be applied to almost any bipedal character.

Expertise provided by Bill Fleming and Martin Grebing **[e]** CHAOS3D@aol.com
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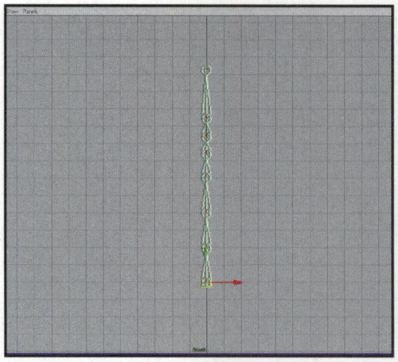
On the CD, you'll find a sample walk animation named strut.avi. This animation illustrates the walk created in this tutorial, as well as the effectiveness of attention to detail with character motion.

Part 1: Building the skeleton

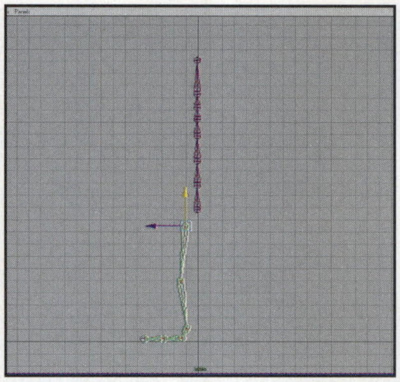
This is where the character takes form – we'll start by naming and attaching the main joints to build a rudimentary skeleton

Stand up

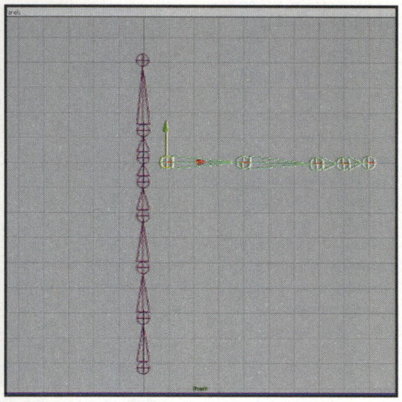
Get involved with your animation! Animators will often sit down in front of their computer screen for hours at a time, struggling to get just the right pose. Stand up, get into character and act out the shot. Whenever possible, record your performance for video reference. Trying to create good character animation without reference of any kind can be a very arduous task, if not impossible.



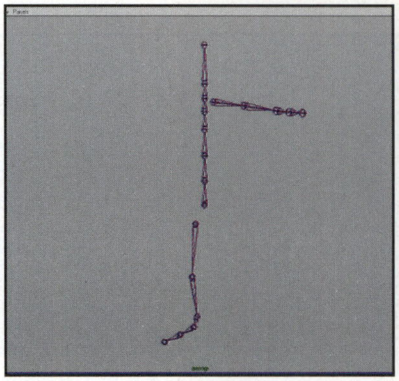
1 First we'll make the Front view active. It's best to turn off Grid Snap to help add slight imperfections to your character. Now create the first joint (the root) near the centre of the screen and work your way up, creating eight joints for the spine. Next, switch to the Side view and add slight curvature to the spine so it isn't perfectly straight.



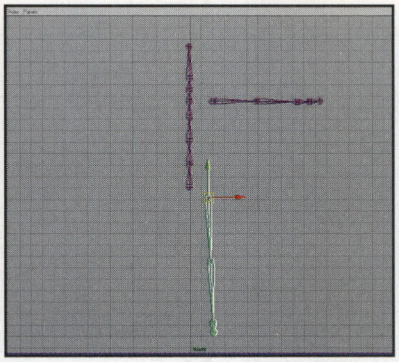
2 Next, make the Side view active and build the leg by starting at the hip and working your way down. We'll include an ankle joint as well as the heel. The ankle is the pivot point for the foot, not the heel. Next we'll put a slight bend in the knee so the IK knows how to solve the leg properly.



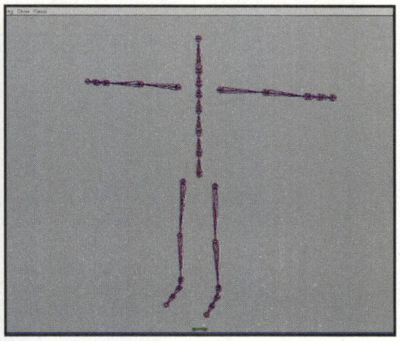
3 Make the Front Orthographic view active and begin building the arm by starting near the top of the top and working your way outwards. You'll need a shoulder joint, an elbow, a wrist, and two more joints to form a rudimentary hand.



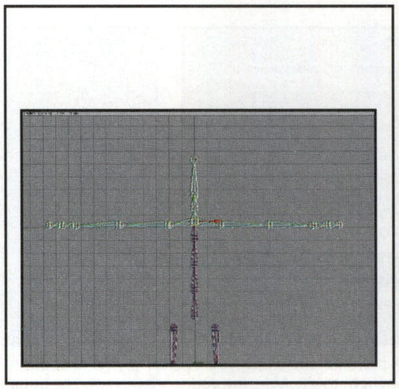
4 Looking at the Perspective view, you can see the character beginning to take form. Now the arm and the leg need to be tweaked and adjusted for scale and proportion. Add a slight bend in the elbow and scale the leg joints appropriately.



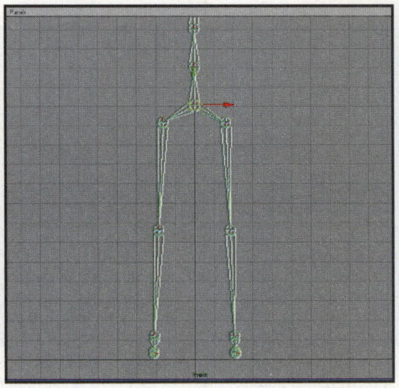
5 Now go to the Front Orthographic view and move the leg into place. We'll give the leg a very slight rotation at the top so it more closely resembles an actual leg. Then move the arm into place and verify that all the joints are properly scaled and positioned.



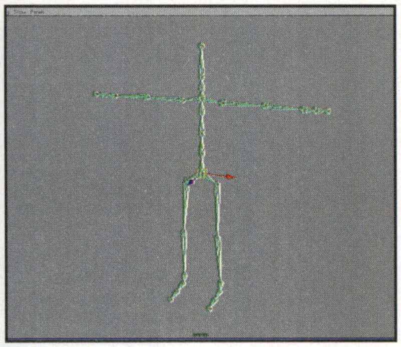
6 Now that we have one arm and one leg, we'll need to create their counterparts. Select the hip joint, then go to the Skeleton menu and choose Mirror Joint (make sure that the YZ Radio button is checked). This will create the character's right leg and automatically put it in place. Now click on the shoulder joint and repeat the process.



7 In the Front view, select both shoulders, then Shift-click on the fourth joint from the very top of the character's spine (the collar). In the Edit menu, select Parent and the arms will now be attached to the character's body.



8 Repeat a similar procedure to attach the legs. First, select the top joint in both legs, and then Shift-click on the Root node and Parent the legs to your character. This will finish attaching the appendages to the spine of your character.



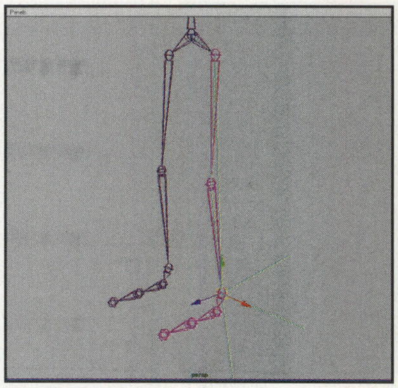
9 Now you can see your character with its nearly completed skeleton. At this stage you'll need to make any last minute changes or tweaks to the skeleton in addition to naming each of the joints. The naming conventions used for your skeleton should be abbreviated, and efficient (ie, Root, Back_Low, Back, Mid, R_Elbow, L_Ankle, and so on). ➤

Part 2: IK set-up

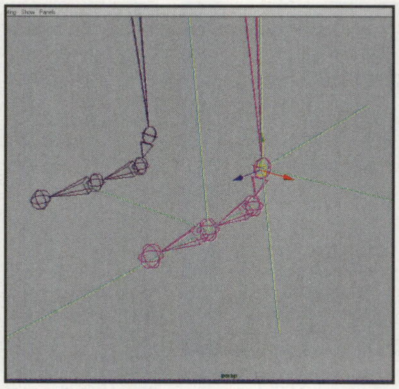
Now to make our character strut – we do this by setting up IK Group nodes, then switching to the Translation keys...

Simple is better

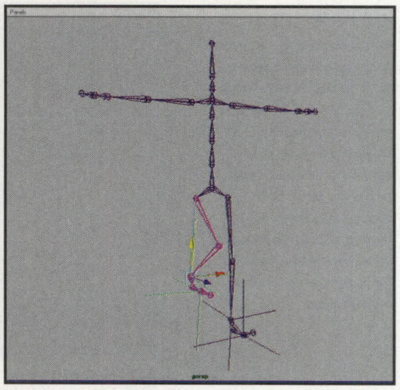
Sometimes people spend too much time designing custom controls and expressions for their characters. This can take control away from the animator, which is the worst thing that could happen. Character animators should be prepared to do a bulk of the work 'by hand' with Forward kinematics. This allows for the highest level of control possible and lets the animator do the animation instead of a mathematical expression.



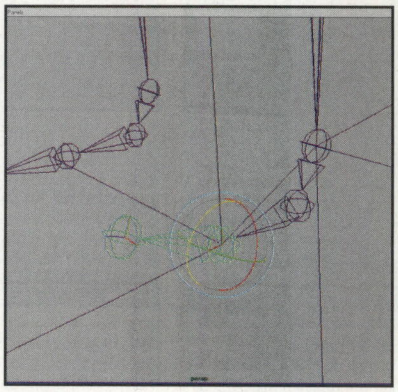
1 IK set-up can be as complicated or simple as you like. Here, a simple but effective set-up will be used. From the Perspective view, zoom in so you have a clear view of the character's left leg. Under the Skeleton menu, select IK Handle tool and click on the hip, then the ankle. You've just created your first IK chain.



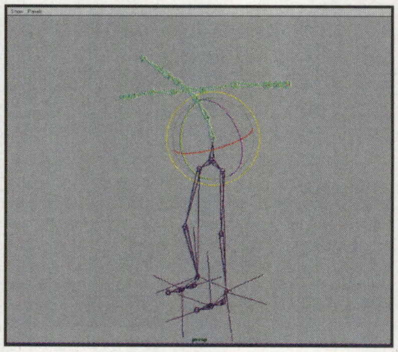
2 Select the IK Handle Tool again, but this time, make an IK chain from the left ankle to the left ball of the foot. Then select both IK handles and Group them together. Finally, press the Insert key and adjust the axis of the IK Group so that it lines up perfectly with the left ankle joint. Name this Group node, L_Foot_IK.



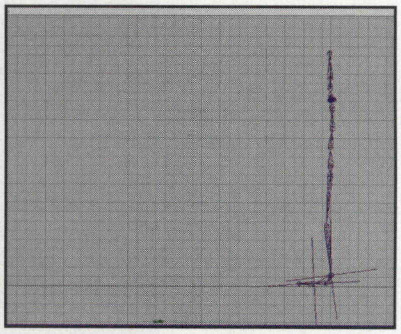
3 Now repeat the same procedure on the right leg. Once this is done, you'll find that moving the L_Foot_IK and R_Foot_IK Group nodes lifts the leg while keeping the foot perfectly level. Moving the IK handle on the heel lifts the leg and keeps the toe pointed down, while moving the front IK handle rotates the foot in any direction.



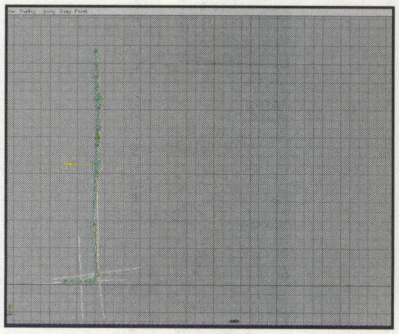
4 With this particular IK set-up, the joint shared by the IK handle on the front of the foot can be selected and rotated separately to the IK to add toe tapping and follow-through.



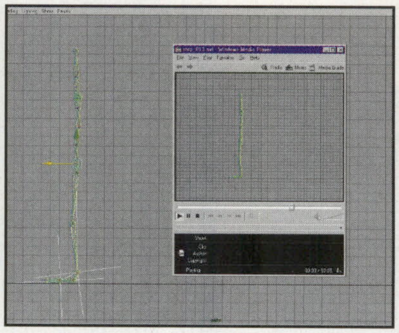
5 Aside from the basic IK set-up on the legs and feet of this skeleton, all other animation will be done using Forward kinematics: that is, selecting each joint individually and rotating them one at a time. This allows for the highest level of refinement and control of your character.



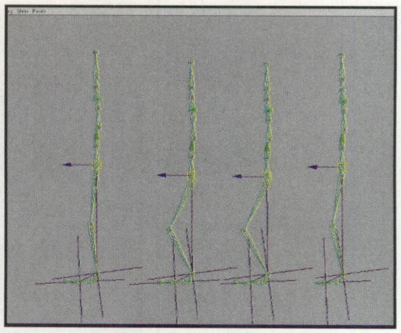
6 Now it's time to begin blocking out the first pass. Start with the broadest motion first, then refine the process with each subsequent pass. The Root node is the top node in the skeleton, so it needs to be blocked out first. Delete all keyframes set during the testing process and make the Side Orthographic view active.



7 The following steps will focus on making the character strut for approximately five seconds (150 frames at 30 frames/second). First, select the Root and IK Group nodes, set keys on the Translation nodes and then move your character in Z (from right to left in the Side view) for the duration of the shot. Finally, set Translation keys.



8 Now make a quick playblast and watch your character float from right to left. Visualise your character strolling along, high stepping, grinning from ear to ear. Then change the Z Translation values and keep making playblasts until the timing 'feels' right. This may take some practice but the more you do it the easier it becomes.



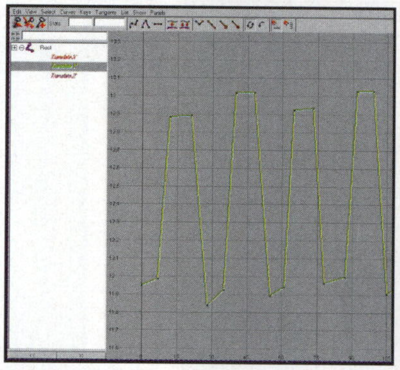
9 The next step is to add Y Translation to the root. The IK handles won't be used in this step. Rewind the animation to the beginning and select the root. The character will be strutting proudly with lots of attitude, so the root will need to lower on the down-step, hold momentarily, and then briskly thrust upward.

Part 3: Adding details

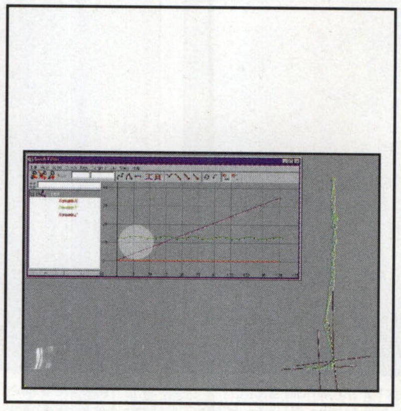
Now to bring our character to life by altering the bodily stance to suggest attitude...

Chip away

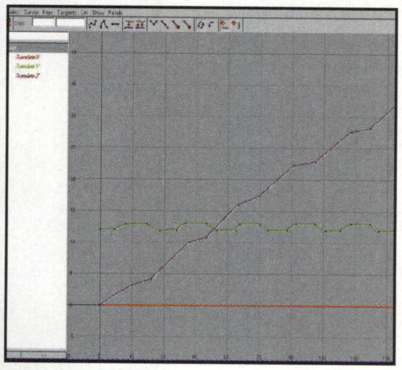
Blocking out the motion gives the animator an overall sense of timing for the shot. The basic joints must be animated and timed out before any secondary motion is applied. Doing otherwise will cause a tremendous amount of unnecessary revisions later in the process.



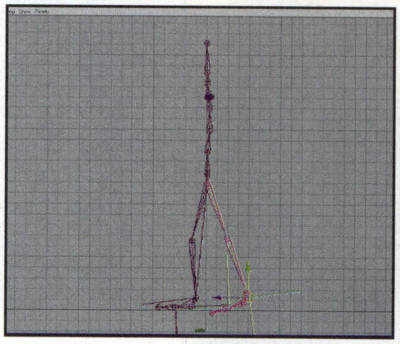
1 The Y Translation curves are uneven but similar as far as purpose and idea are concerned. Adjusting the timing for the Y Translation will begin to give a very good idea of the feel and timing of our strut. To tweak the overall timing of the shot, simply adjust the Z Translation key at frame 150.



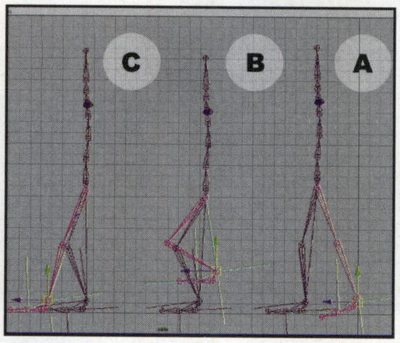
2 The next step is to adjust the Z Translation in accordance with the up-and down step of the character. A strong strut usually involves the character almost pausing at the top of its stride to stick the chest out.



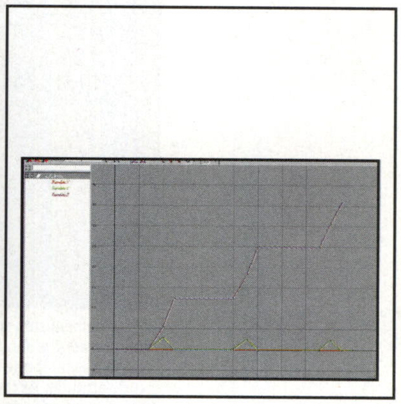
3 As the character reaches the peak of the Y Translation, slow down the Z Translation (but don't stop it completely – the character should always be moving forward). As the character lowers its root in Y, accelerate the Z translation. You can see how the slowing of the Z Translation coincides with the peak of the Y curves.



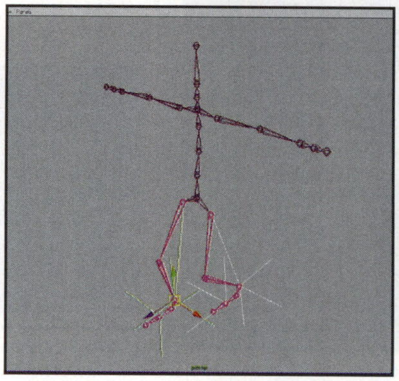
4 Now that the translation for the root has been blocked out, the feet need to be animated. From the Side view, select the L_IK_Group. Then open the Graph Editor and delete the Z Translation keyframe at frame 150. When we scrub the animation, the left leg stays locked down and doesn't move with the root.



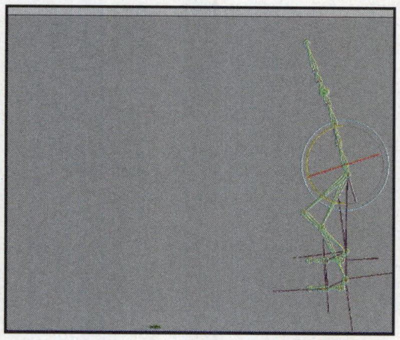
5 Next, find where your character's stride is extended (A). Then keyframe the L_IK_Group. As the root reaches the bottom of its descent (B), move the L_IK_Group up and forward and set another keyframe. Then move the L_IK_Group forward, key it, and set another keyframe before the root reaches the peak of the Y translation (C).



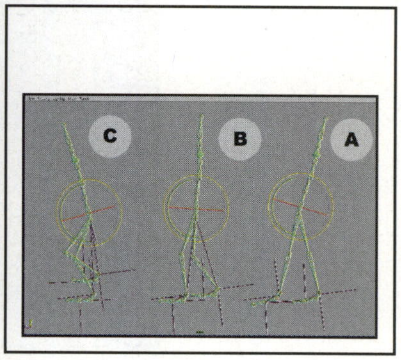
6 Repeat this process for the duration of the shot. Remember the left leg will only be stepping every other time. The leg will take one step for every two times the root bounces.



7 Now that the motion for the left leg has been blocked out, it's time to do the same for the right leg. Repeat the same technique for the right leg for the duration of the shot. At this stage you can really see your character start to come alive.



8 The next step is to add rotation. Select the root in the Side view. As the character reaches the peak of its up-step the upper body should be bent forward in anticipation, thrusting the chest out. Keep the root's rotation fairly conservative at this point because there are three more joints in the back to animate later.



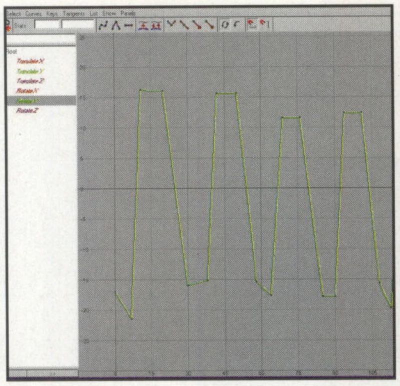
9 As the root reaches the bottom of the Y Translation and the front foot has planted, rotate the root forward. When the root reaches the top of the Y translation (A) the root should be rotated backwards. Hold this position until the root descends (B), then rotate the root forward (C). ➤

Part 4: Secondary motion

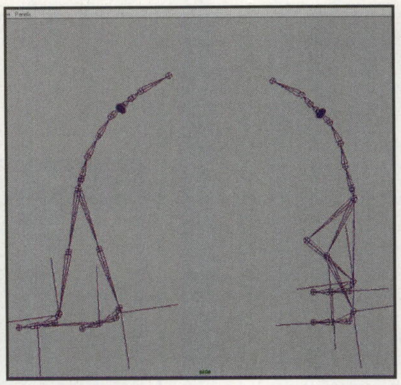
Finally, we'll give the whole walk more personality by adding rotational values to the upper body and feet...

Follow-through

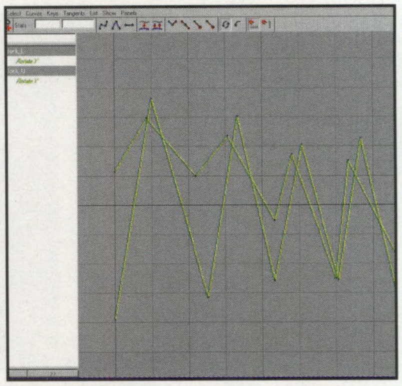
Secondary motion gives life and visual appeal to a character while adding a sense of realism. The follow-through motion of each joint in a chain relates closely to the previous node. Generally, the further away a joint is from the root, the faster and more drastically it will need to be whipped back and forth to achieve good follow-through.



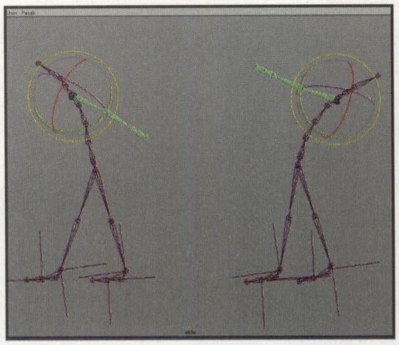
1 Repeat this process for the whole shot. Then tweak the curves for the rotation of the root so the character really snaps into the chest-out pose. Slow motion curves into this pose will be counter-productive to establishing attitude and flair.



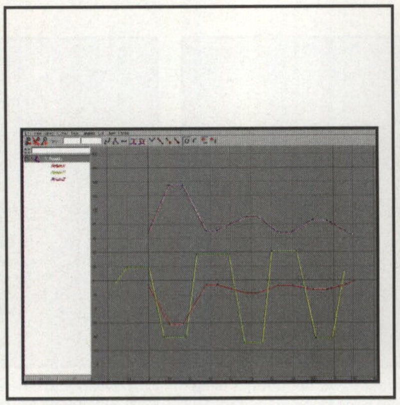
2 Now we'll need to add rotation to the lower back, mid back, upper back and neck. Each joint may have similar Rotational values but the further we move away from the root, the more the timing will be offset to achieve follow-through.



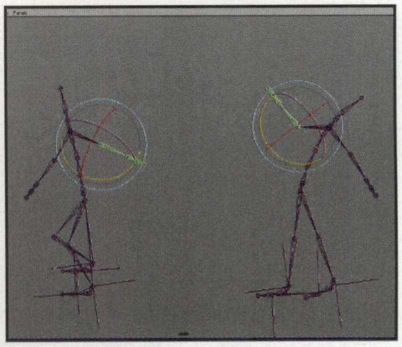
3 You can see by looking at the Lower and Upper Back Rotational values together how similar they are in value and timing. Offsetting these curves by only a few frames can change the entire feel and quality of follow-through for the entire shot.



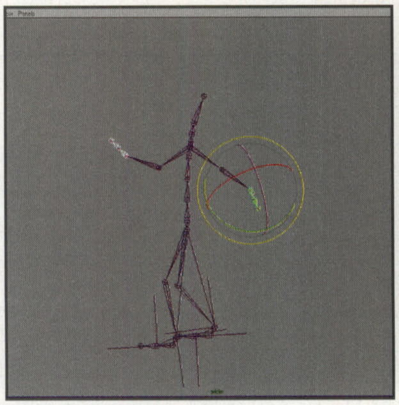
4 The next step is to animate the left arm. Rotate the shoulder down by your character's side. We want it bowed slightly outward to help exude attitude. As the character's right leg steps forward, the left arm should also swing forward. As the leg trails behind, the arm should swing back.



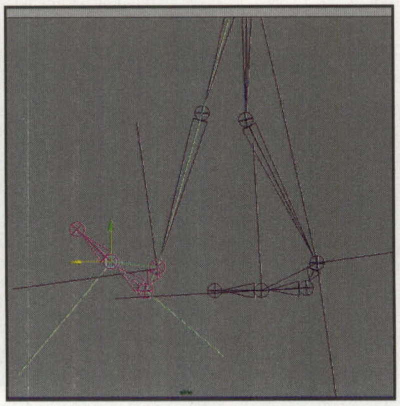
5 The right arm will need to be animated with very similar movements as it alternates with the left arm.



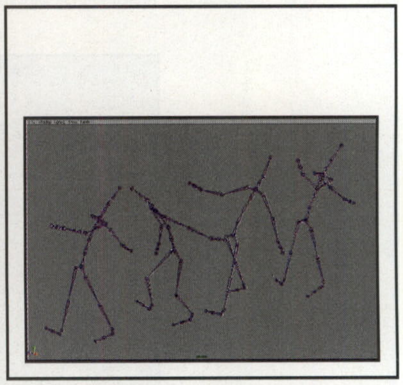
6 Next each of the elbows will need to be animated. Elbows will trail slightly behind the shoulder and add quite a bit of personality to the movement of the arms. They will need to snap forward after the shoulders rise in front of the body, and ease out as the shoulders swing back.



7 After the elbows have been blocked out, the wrists will need to be animated to add follow-through to your arm swing. Again, with follow-through, the motion will be similar in timing and feel to the joint below in the hierarchy, but the curves will need to be offset by a few frames.



8 Finally, we need to block out the motion for our character's foot rotation. The front heel should touch ground and point the foot skyward with each step forward. After the ankle rotations have been blocked, we'll need to animate the front of each foot to add follow-through.



9 To finish the process, we need to animate all of the main joints (root, back, neck, shoulders) on the other two axis to add twisting and tilting. Upon completion, all of the motion curves should be changed to Flat and Spline. You will need to experiment with flattening out the peaks of the Spline curves to get the desired motion. ca•s

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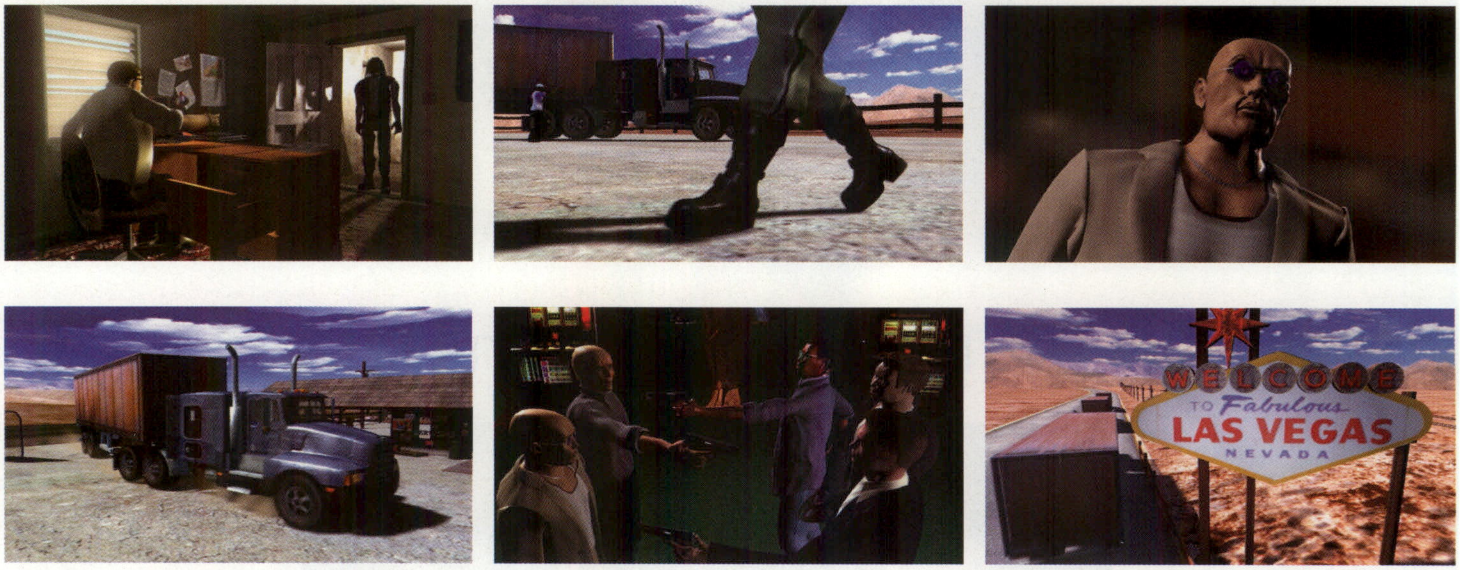


This series of full motion video (FMV) sequences for the long-awaited *Driver 2* was HR3d's début in 3D animation for the games market. "We had to do seven or eight minutes in three months," says Alan, "We usually take that long to do a 30 second commercial. It was a discipline – we had to work in a different way." Completed in August 2000, the sequences went on general release in November.

In *Driver 2* the main character, Tanner investigates the US crimelords' money wars, in an adventure that takes him to Chicago, Las Vegas, Havanna and Rio. Again, HR3d used *Maya* to create the gritty realism and locations within the FMV sequences.

HR3d

"CGI is becoming cheaper and the appeal and market are broadening. We have to adapt to that," **says Alan Bassett, co-founder of the trail-blazing animation company HR3d**

Most of the designers at animation company HR3d have a background in commercials, but as director Alan Bassett points out, they're willing to explore other areas. "It's a broad market and you wouldn't want to concentrate on one sole area," he says. "CGI is becoming cheaper and the appeal and market are broadening. It used to be used in high-end commercials and feature films, but the costs are coming down. We have to adapt to that and adapt the business to suit."

HR3d's recent full motion video (FMV) sequences for the PlayStation game *Driver 2* (which went on general release in Nov 2000) are part of this movement into other markets. Other projects currently on the go include a children's TV series which HR3d is developing in collaboration with sister company HRTV, and it's also working on a simulator theme park ride.

"Personally, I think you have to try different things," says Alan. "It's about recognising that those areas are there and trying to get into them. It isn't easy to move away from areas that you've had to specialise in, but we've had to do it."

Learning curve

Talking of specialist areas, HR3d is probably best-known for its cutting-edge animated commercials – most notably, the Twister ad for Hasbro (October 2000) and the Weetos 'Contact' commercial for Weetabix Weetos. Alan co-founded the company in 1999 with John Wake, whom he first met at Eye, a company set up by John, where they co-directed spots for Ribena and Milky Way Magic Stars among others. Previous to this, Alan had been 2D Director at Hibbert-Ralph Advertising.

"I left Eye to pursue a different direction," explains Alan. "Then Jerry (Hibbert) and Kim (Burdon) from HRA rang to say they wanted to spin the 3D department off in a different direction, and we talked about setting up a company."

Alan was keen to accept the challenge: soon after, John came on board and HR3d was born. "I still like 2D but 3D has a much broader scope: TV series, feature films, commercials - there's a vast variety of effects and fields you can work in. And the software has developed to such an extent that you don't have to be so technical." Although moving from 2D to 3D was "quite a jump", Alan had previously learned *Maya* at Eye, which facilitated the learning curve. It also meant that he was doing animation for commercials within four or five months of starting up HR3d.

"I was lucky - I started as a consultant working on storyboards and learned character animation within that environment. Alias/Wavefront's *Maya* encompasses everything we want to do. You can write your own software but we haven't had to write much custom routine. We just use *Maya* as it comes really."

Evolving in-house

Located in West London, the HR3d office houses five members of staff, although there are seats for twice that number should extra staff be drafted in. "We ➤

Alan's tips

Foot in the door

"I started as a messenger, but it depends on your experience. We look at portfolios and showreels, not qualifications. George can model better than most people, so we took him on. Do some work to show people what you can do. And don't worry about using highend software – it's better to have one short piece of good work than a long piece of second rate work. A few seconds is more impressive. Getting the first foot in the door is always difficult but once you're in, you're in".

Acting it out

"When Martin was doing the LA scenes for *Driver 2*, he acted things out in front of the mirror. It really does help: we've all got mirrors on our desks. Also, for Twister, we filmed the voiceover artists because it's useful to hear certain voice inflections, and see how people move - the gestures they make."

1

2

1. For this series of television commercials for Huggies Supreme Diapers entitled 'Forest', Alan worked to a brief from the advertising agency Ogilvy & Mather New York. For the 30 second commercial which was screened in the US in December, HR3d animated fairy wings attached to a real baby wearing Huggies Supreme Diapers and a computer generated butterfly. The flowers, plants and forest environment were computer generated using *Maya*. "The challenge was trying to integrate 3D and live action," says Alan. "We added more flowers and trees and things. The plants all had to appear as though they were from the same set."

2. Devised to advertise the children's game Twister by the advertising agency, Burkitt DDB, this ground-breaking ad was launched in October 2000 and shows five species of primate playing Twister.

The animation was outstanding for the way that shades and textures - fur in particular - were clearly detailed to a level never seen before in this country. HR3d used *Maya*'s own built-in rendering engine and fur capabilities and the results were amazingly organic looking. "You can write custom routines to enhance *Maya*, but we used it straight," says Alan. "We hadn't done anything using fur to such an extent, which was the big challenge: that, and creating a believable environment."

kept it small because of the nature of the work, and it means we have tighter executive control," says Alan. Work is done on three SGI Octanes and two Indigo 2 Extremes, with a dual-processor PC for file rendering.

Unlike 2D animation which is very much a linear process, from storyboard to line test to adding colour and effects, the various stages in the 3D process can progress simultaneously. "Professor Weetos was modelled at the same time as the backgrounds were being coloured," explains Alan (see the boxout on page 73). "Everything is being enhanced at the same time and everyone can have their say."

HR3d is pretty much a one-stop shop with everything being done in-house, from storyboarding, usually done by John or Alan, to the finished film. "I enjoy the whole process, but seeing the initial design is always good – and seeing it finished of course."

Alan believes that HR3d also has a recognisable house style. "It's quite a highly illustrative look," he says. "Our pieces of work are more character-led than effects-led. We concentrate on the background, look and feel, but can do other styles."

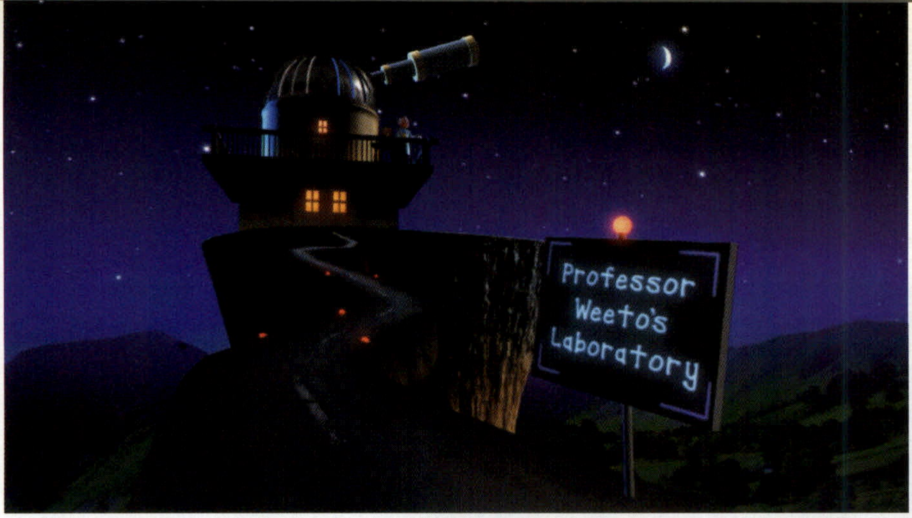
New levels

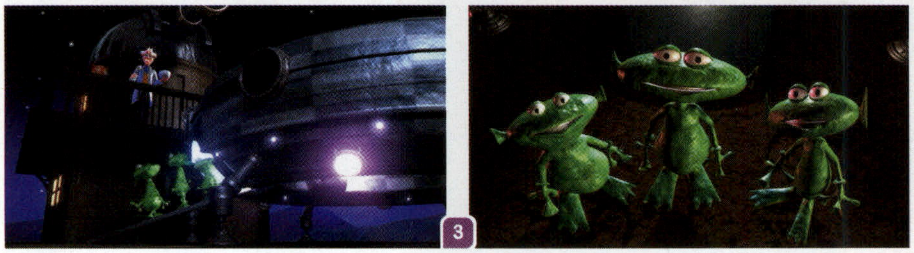
The game-playing primates featured in the recent Twister commercial for Hasbro (October 2000) are brilliant examples of this illustrative style. The animators were able to use *Maya*'s fur rendering capabilities to take the detail in the primates' fur to a level not previously seen on such a scale in the UK. The ad is proof that you don't need specialised software or large teams to push back the boundaries of what's creatively possible. In fact, Alan feels that the possibilities inherent in CGI are inspiration enough. "3D used to be a bit effect-sy a few years ago, but now it can stand alongside 2D and stock animation as an art form in itself," he says.

It's also an art form that's becoming more sought after by the movie industry, but there are drawbacks to attempting projects on the scale of the animated tigers in *Gladiator*, for example. Not least of these is the huge investment in scanners and technology that would be required. As Alan explains, one solution would be to pool resources with another studio: "We're more of a specialist boutique, so we'd be more likely to work alongside a partner in the film industry. The same goes for a TV series that would require a lot of people."

It's an expansive attitude that should see HR3d's creations appearing just about everywhere, from the big screen to video. But with the emphasis firmly on artistic skills, HR3d won't be compromising on quality. "We've all got art school backgrounds, so we're designers first and computer operators second," says Alan. "We value the people on the workstations more than the software they're using." **ca▸s**

Contact HR3d at 10 D'Arblay Street, London W1F 8DS [t] 020 7598 9436 [w] www.hr3d-online.com. You'll find an HR3d showreel in the dual\tutorial folder on the cover CD.





3

3. "Doing a completely 3D Professor was a good challenge. It's always fun bringing characters to life and injecting them with a personality," says Alan. Entitled 'Contact', this fully 3D animated television commercial for Weetabix Weetos cereal, was devised by the advertising agency Lowe Lintas for the UK market. First televised in March, the 30 second commercial was directed by John and Alan and animated by Martin Allan.

Previous Weetos commercials used clay animation, but HR3d broke away from that by using *Maya*. The animation shows a flying saucer landing in front of Professor Weeto's observatory, and the three bug-eyed aliens who emerge from it.

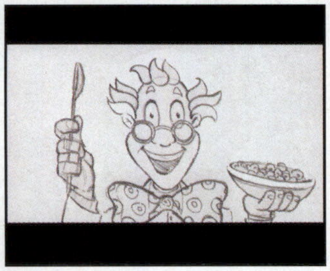
4. Also for Huggies, this 'Leaf' commercial followed a similar nature theme. Animation was by Martin Allan, with Alan directing and the whole thing was produced by Ogilvy & Mather New York. The script called for an animated Baby Wipe to follow the journey of a baby, cradled in a leaf, as it floated down a stream.

The live action was directed in Vancouver, then all the elements were shipped to HR3d's London office for animation. Several post-production elements were then added including the Wipe, the smile on the baby's face and a computer-generated leaf which mirrored the version shot as part of the live action. "Once the advert's been created, we use *Composer* to put all the different elements together," says Alan. "The challenge is to create stuff that looks the same as the live action."

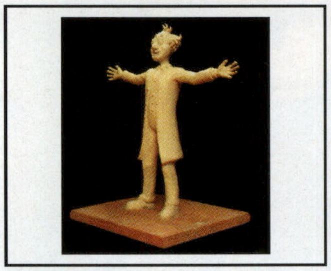
4

From paper to Maya

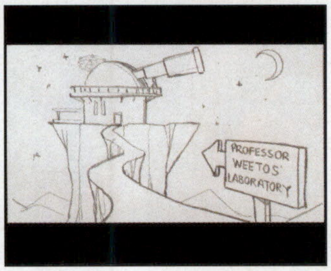
How HR3d brought Professor Weetos to life



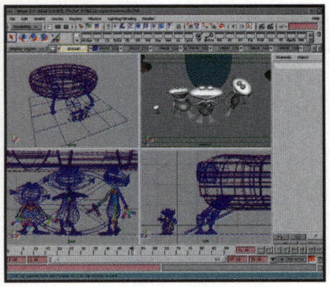
1 The storyboard stage. Alan based his designs on 2D drawings of the Professor already on the cereal box so that the character would be instantly recognisable. The aliens, observatory and other story elements had to be designed from scratch. This stage only took about a day, with about three drawings to an A3 page.



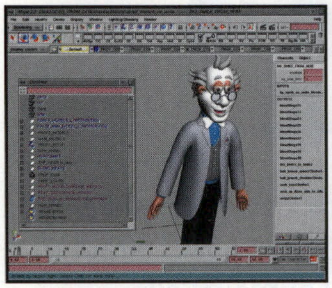
2 "Computers are good at geometric shapes. The aliens, which were mostly composed of spheres, were built just on the computer," explains Alan, "but Professor Weetos was more complicated." A sculptor was brought in to make an 18-inch 3D model out of clay. This was also helpful for the client, who could look at the model from all angles and get an idea of how the finished Prof would look.



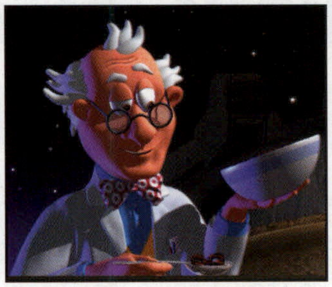
3 At the same time, HR3d laid out the film storyboard panels as a 2D flick story. About 20 or 30 of these pictures were then shot on to video tape, each lasting about two seconds, for the ad agency. These served as a guide to how the narrative and timings would work.



4 During this time, HR3d staff were also building the background, observatory, aliens and so on. Martin Allan worked on the aliens while new recruit George did the models. "The shaded-in scene shows the view through the camera, and the other scenes show different angles of the same shot in wireframe," says Alan.



5 After the client had approved the 3D model, Scanstore swept a laser round it, enabling the computer to compile an exact on-screen replica from the data. HR3d then effectively rebuilt the computer model, taking out any details that weren't needed. The next step was to build a skeleton inside the computer model to give Professor Weetos realistic joints and muscles.



6 The Professor was then put into the 3D computer background and movement layouts were programmed (to determine what moved within the scene and when). Final improvements were made, including refining full movement, the correct colours, texture, and so on.

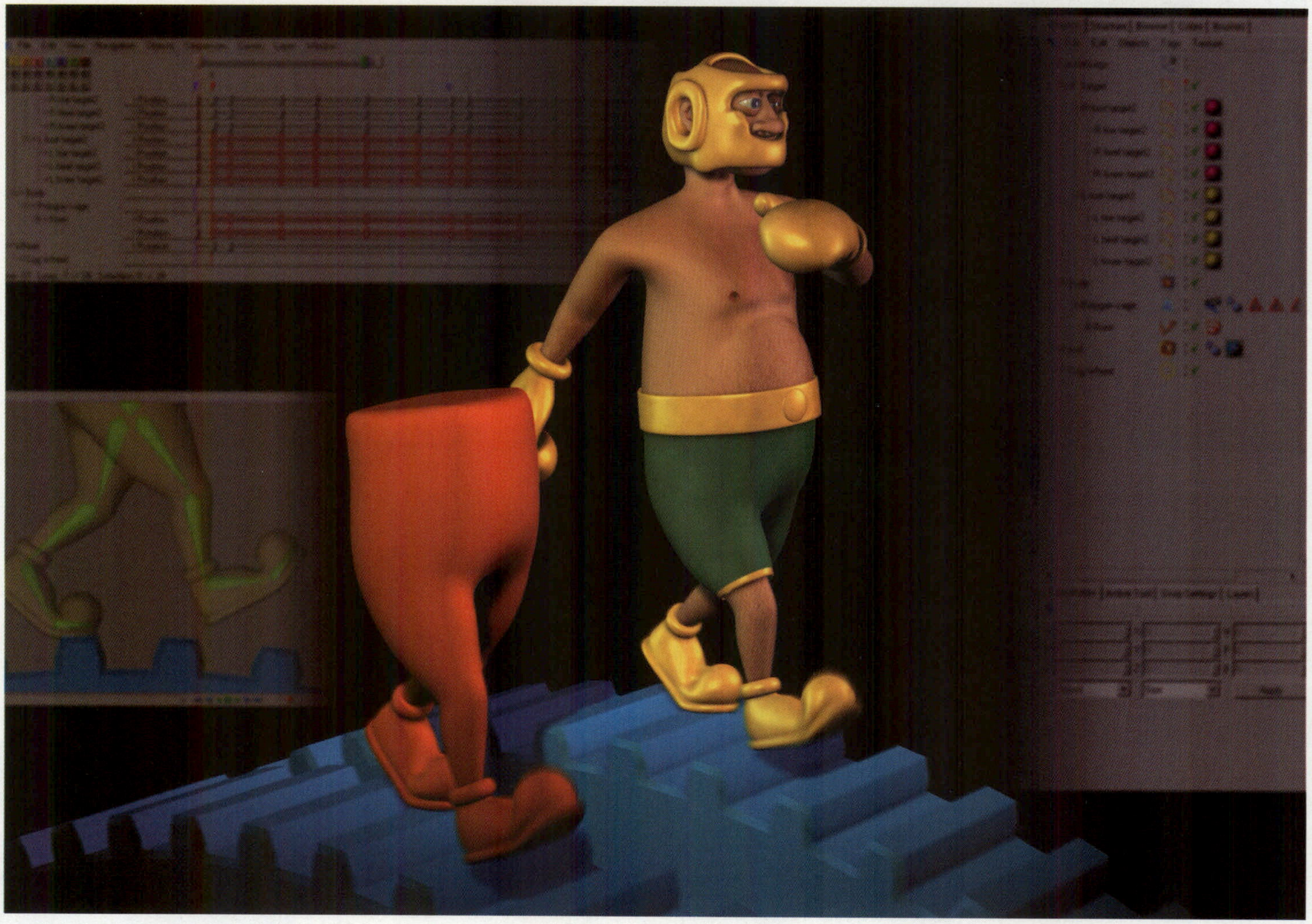


Illustration: Steve Townrow [w] www.stanimations.com

Animating a walk cycle in Cinema 4D

Creating a convincing walk cycle can be a challenge even for an experienced character animator. Steve Townrow explains all

Expertise provided by Steve Townrow [w] www.stanimations.com

Files for this tutorial are on the cover CD in the **dual\tutorial\cinema 4D** file. There's a demo version of *Cinema 4D XL v6.1* on the disc. Software is available from Maxon's UK distributor, Hisoft. Go to **[w]** www.hisoft.co.uk or **[t]** 0500 223 660

The walk of a character can reveal so much about personality and demeanour – happy or sad, angry or scared, you can tell so much from body language. An Inverse Kinematic rig is a common technique used to animate the legs of a model with only a few controller objects – by using *Cinema 4D XL6*'s excellent Bone and IK system, we'll break it down and see how it's done. With the help our character we will create a complete walk cycle, so let's get him into shape...

Part 1: IK set-up

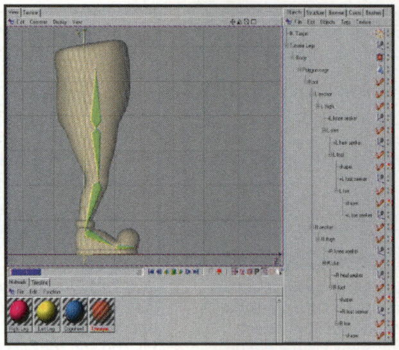
For simplicity, we've decided not to use IK tags to restrict the joint movements, so we need one controller per bone...

Tutorial files

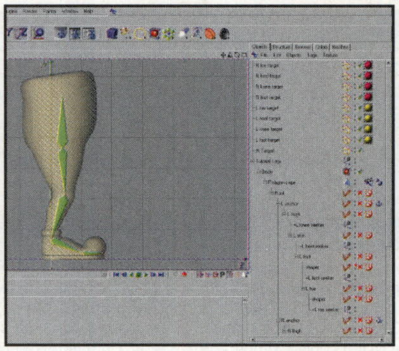
If you find that a stage doesn't work correctly or you make a mistake, try that section again or continue the tutorial using the next file on the cover CD. Read each stage before you attempt it and remember to save your work as you go.

Coming soon

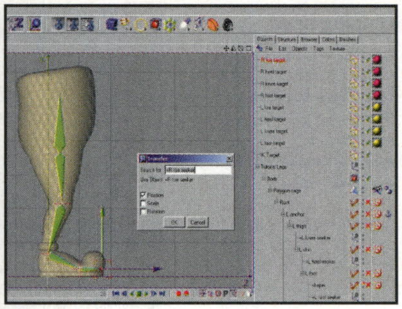
Third-party plug-ins will soon be available to make *Cinema 4D XL* even more powerful at rigging and manipulating bones for character animation.



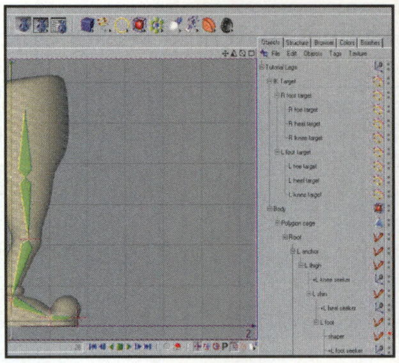
1 Open up the project WalkCycle1.c4d. Make sure you have a Right Side view of the model and expanded hierarchy of the legs. You will see a simple leg set-up from thigh bone through to the toe bone (you can ignore the shaper bones). The bones should be turned off along with the Global Animation and Expression icons.



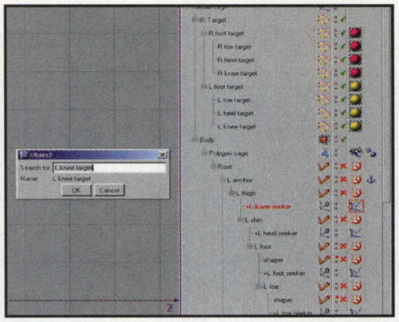
2 You will see four seeker objects in each leg. We will now create two sets of IK target objects for these to follow and animate just those. Create four copies of the IK target spline object, named: foot target, L knee target, L heel target and L toe target. Do the same for the right leg using the prefix R for each name and give the splines a different colour.



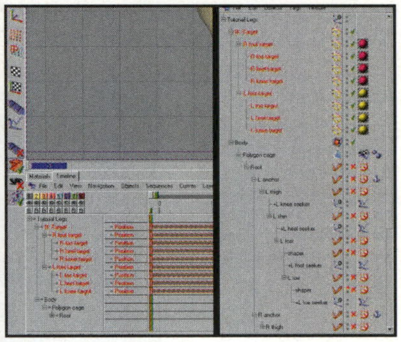
3 We will now move each target to its corresponding seeker object. Select L foot target and using the Functions/Transfer command, search for +L foot seeker and tick the Position option. Do the same for the L knee target, L heel target and L toe target and position them at their corresponding seekers: +L knee seeker, +L heel seeker and +L toe seeker respectively. Do the same for the right leg targets and their seekers.



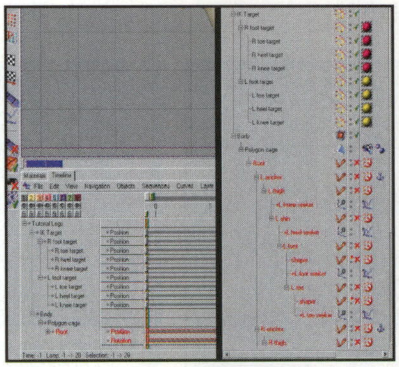
4 Rearrange the left target objects so they are children of L foot target. Do the same for the right leg by placing them under R foot target. Put both sets under the IK target object and then under the Tutorial Legs object as shown in the screenshot. This will ensure that if we move the whole model around, the IK targets will stay with it.



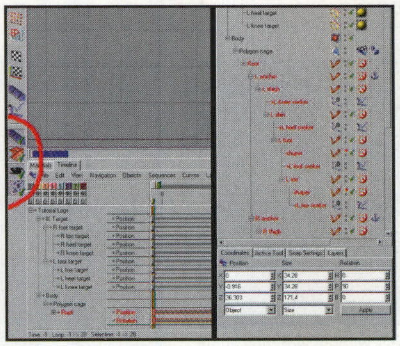
5 In order for the bones to follow the targets we have created, we need to add an IK Expression tag to each seeker object. Do this now for the +L knee seeker object and when prompted, type the name of the IK target object, L knee target. Create IK Expression tags for the other seekers of the left leg using the corresponding target object names. Do the same for the right leg seekers and their corresponding targets.



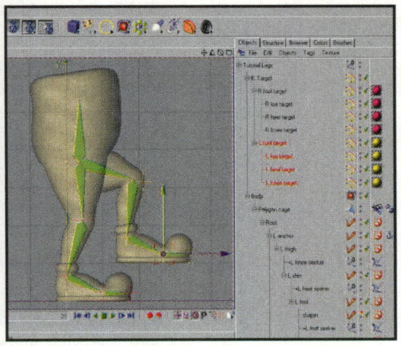
6 We will now record the default positions of the IK targets. Go to frame -1 and bring up the timeline. Throughout the tutorial, it is only necessary to record the Positions of the IK targets, so in the Time Manager palette, select only the Position and Hierarchy icons. In the Object browser, select the top level IK target object and hit the Record button.



7 We also need to fix the initial position of the Root bone since this will move and rotate during the walk cycle. Throughout the tutorial, select only Position and Rotation (not Hierarchy) when recording keys for this. Set those, then select the Root bone in the Object browser and hit Record.



8 Save your work, as we are about to test the IK set-up. Fix all the bones by right-clicking on the Root bone and selecting Fix Bones. Turn the Animation and Expression icons on. The legs should stay in place. If they do not, it is likely that one of the seekers is referencing the wrong target and you should reload the project to correct the fault.



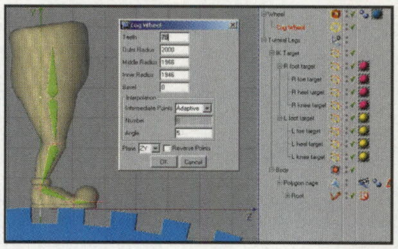
9 If you now move, say, the L foot target around, the left leg and foot will follow. It is quite easy to move the IK targets into positions that are too extreme, which is why we saved them at frame -1. Undo any movement of the IK targets, make sure the bones are in the default positions and save your work.➤

Part 2: Walk cycle preparation

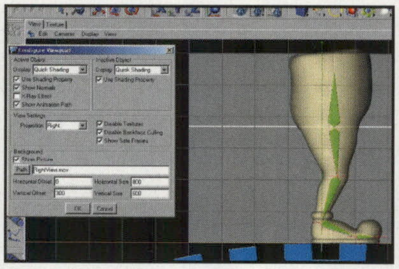
One very useful technique for ensuring that the feet are pinned to the floor is to use a temporary landscape as a guide that moves under the feet...

Helping hand

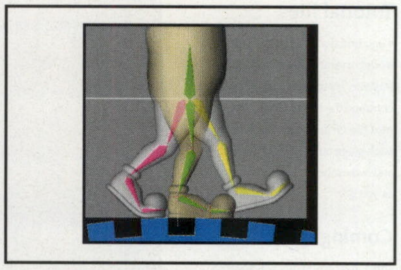
Creating a walk cycle from scratch is a tricky business, so to help, the cover CD contains a Side view animation of one leg step. Copy the animation to a working directory on your hard disk for faster access



1 Create a cogwheel spline with 75 teeth, bevel 0 and three radii of 2,000, 1,966 and 1,946 respectively. Put this inside an Extrude NURBS object and set the X/Y/Z Movements to 300, 0 and 0 respectively. Name the NURBS object Wheel and move it to XYZ position (-150,-1995,13). Select Wheel, move frame 0 and save a Rotation key with values of 0. Move to frame 28, rotate Wheel around the X axis by 19.2 (P=19.2) and save a new key.



2 With the Side view window open, select the Tutorial Legs object and hit O to frame the active object. In the Side view window, select Edit/Configure. Check the Show Picture option, click the Path button and navigate to the RightView animation. Set the Horizontal and Vertical Offsets to 0 and 300, and the Horizontal and Vertical sizes to 800 and 600 respectively, then hit OK.



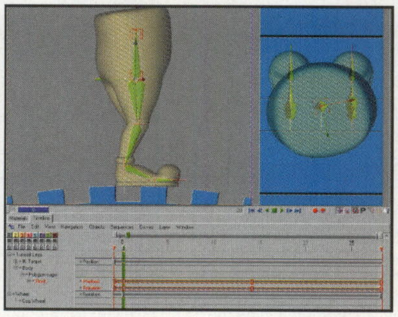
3 The white lines in the background picture should line up with the Root bone. If they do not, adjust the values for the Offsets and Sizes until they do and the background model is the same size as ours, but keep the aspect ratio correct. Now if you scrub the time (drag the blue frame counter), you will see the leg animate one complete cycle and approximately stick to the cogwheel.

Part 3: Learn to pose

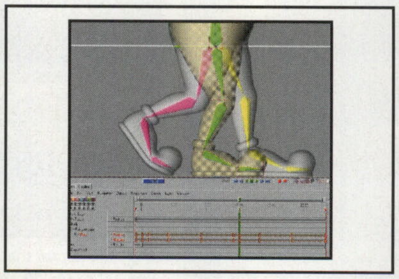
When positioning the legs, try to keep the IK targets as close to their matching seeker objects as possible

Reset often

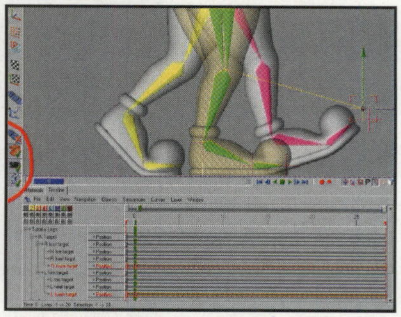
If the knees flip backwards or the feet become distorted (due to errors creeping into the IK calculations), turn on Animation, return to frame -1, reset all bones, and then fix them again. You can now carry on where you left off...



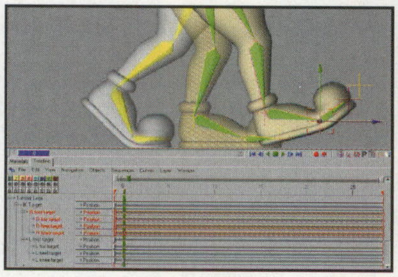
1 As the legs are children of the Root bone, we should set up the hip rotation first. Move to frame 0, rotate the Root bone around the Z axis by 12 (B=12) and record a key (use just Rotation recording for this). Move to frame 14, rotate the Root bone back to -12 (B=-12) and record a new key. Move to frame 28, rotate the bone to 12 (B=12) again and record this.



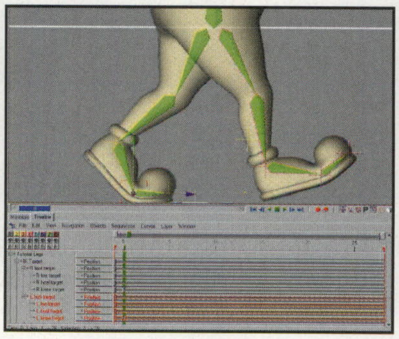
2 Let us set the Root bone Position to follow the hip movement of the background. Turn on Animation, move to frame 4, set the Root bone Y value to -27 and hit Record (with Position and Rotation recording only selected). Do the same at frame 18. Add two keys at frames 9 and 23 after adjusting the Root bone height to match the white line. At frames 1 and 15, record a key with Y value of about -8. These last keys provide the jarring of the hips as the feet hit the floor.



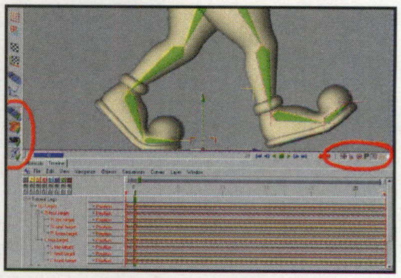
3 It is important to always keep the knee target objects in front of the shins or the knees might flip backwards. Turn off Animation, move to frame 0 and select the R knee target object. Drag it forward so that it is beyond the toe but perpendicular to the shin. Do the same for L knee target. Now select Position and Hierarchy recording and record keys for these two targets.



4 We can pose the legs without worrying about the knees flipping. The right leg is in front, so select R foot target and drag it into place over the ball of the background right foot (pink bones). Now position the heel and toe targets to match the rest of the right leg and foot. It will be easier to position the knees as you move the heel targets rather than with the L/R knee target objects themselves.



5 Now pose the left leg in the same way. Select the L foot target and drag it to position over the ball of the background left foot (yellow bones). Move the L heel target to correct the knee position. The toe target should not need moving.



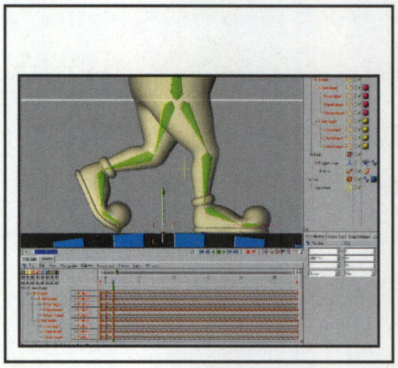
6 We are now ready to save the positions of both sets of leg targets. Ensure that Position and Hierarchy recording are switched on, select the IK target object in the browser and hit Record. Now turn on Animation and move the time slider between frames -1 and 0 to check our first pose. Do not turn Animation back on until you have recorded the positions of all the targets at a particular frame.

Part 4: Animate the walk cycle

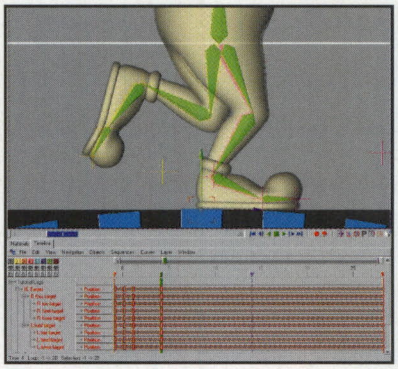
When creating a looping walk cycle, it is important that the first and last frames are identical...

Go further

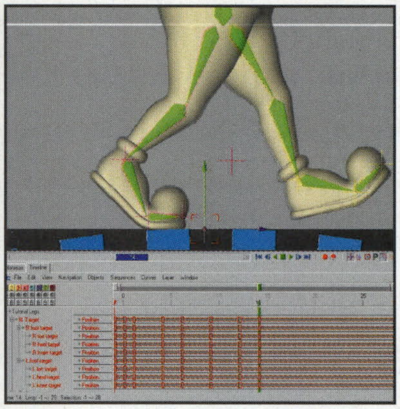
As you can see from the final animation of Septic Jones on the cover CD, the arms swing in the opposite direction to the hips, keeping the body in balance and harmony. Septic also has a bouncy wobble to his stomach, which is timed as each foot hits the floor. This is called Secondary Animation and its this extra detail that can really bring a character to life...



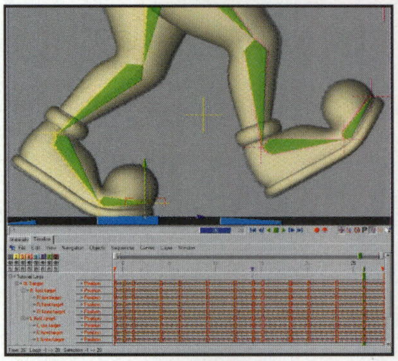
1 Set the legs at frame 1 now. The steps to pose the legs at any frame are: 1. Move to the correct frame with Animation turned on, 2. Turn off Animation, 3. Pose each leg starting with L/R foot target, 4. Select Position and Hierarchy recording only, 5. Select the main IK target object and hit Record, 6. Turn on Animation, 7. Scrub the time to check the motion.



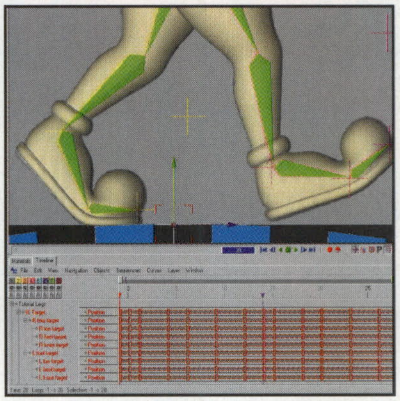
2 Put a marker in the timeline at frame 14. This is the halfway point and is a useful guide since after that, the leg posing is symmetrical. There are frames that we must key to control the step and some that we can leave for *Cinema* to interpolate for us. The next important one is frame 4, so pose and record the legs at that frame now. Remember to adjust the knee target to be in front of the shin.



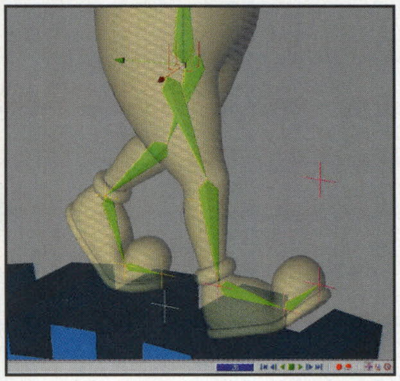
3 Pose and record the legs at frames 6, 9, 12 and 14. You will have to move the L knee target forward first while posing frame 9 or the knee might flip. Frame 14 should look similar to frame 0 (with the legs reversed) but small discrepancies are okay and will help the walk look less mechanical.



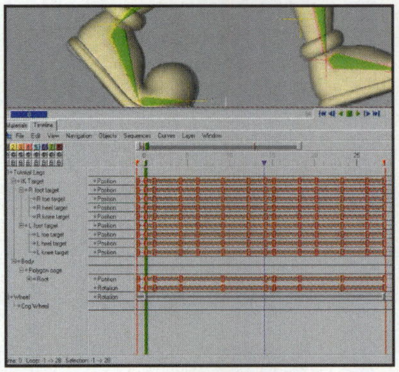
4 Now that we have reached halfway, we must key the other half using the same intervals between keys. So where we created keys at frames 0, 1, 4, 6, 9, 12 and 14, the same must be done at frames 15, 18, 20, 23, 26 and 28. By now you should be able to pose the legs quite quickly. Create these keys now.



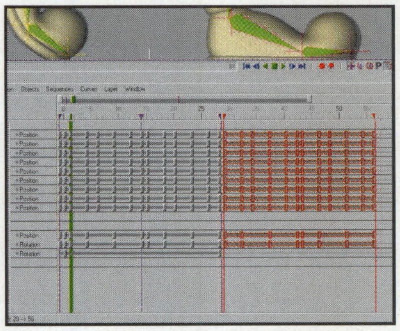
5 Make sure the leg pose in the last frame, 28, is as similar as possible to the one in frame 0. To do this, click in the timeline to set the frame to 0, then 28 and back again. This will highlight any differences, which should be corrected.



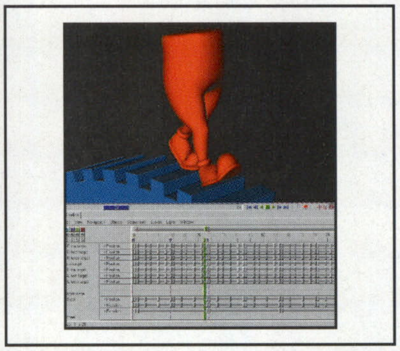
6 We now have one complete step, which you can render from frame 0 to 27. Do not include the 28th frame in the rendering – that is there just to define the last pose. However, if we want multiple steps we must duplicate the sequences without the first frame on the copies.



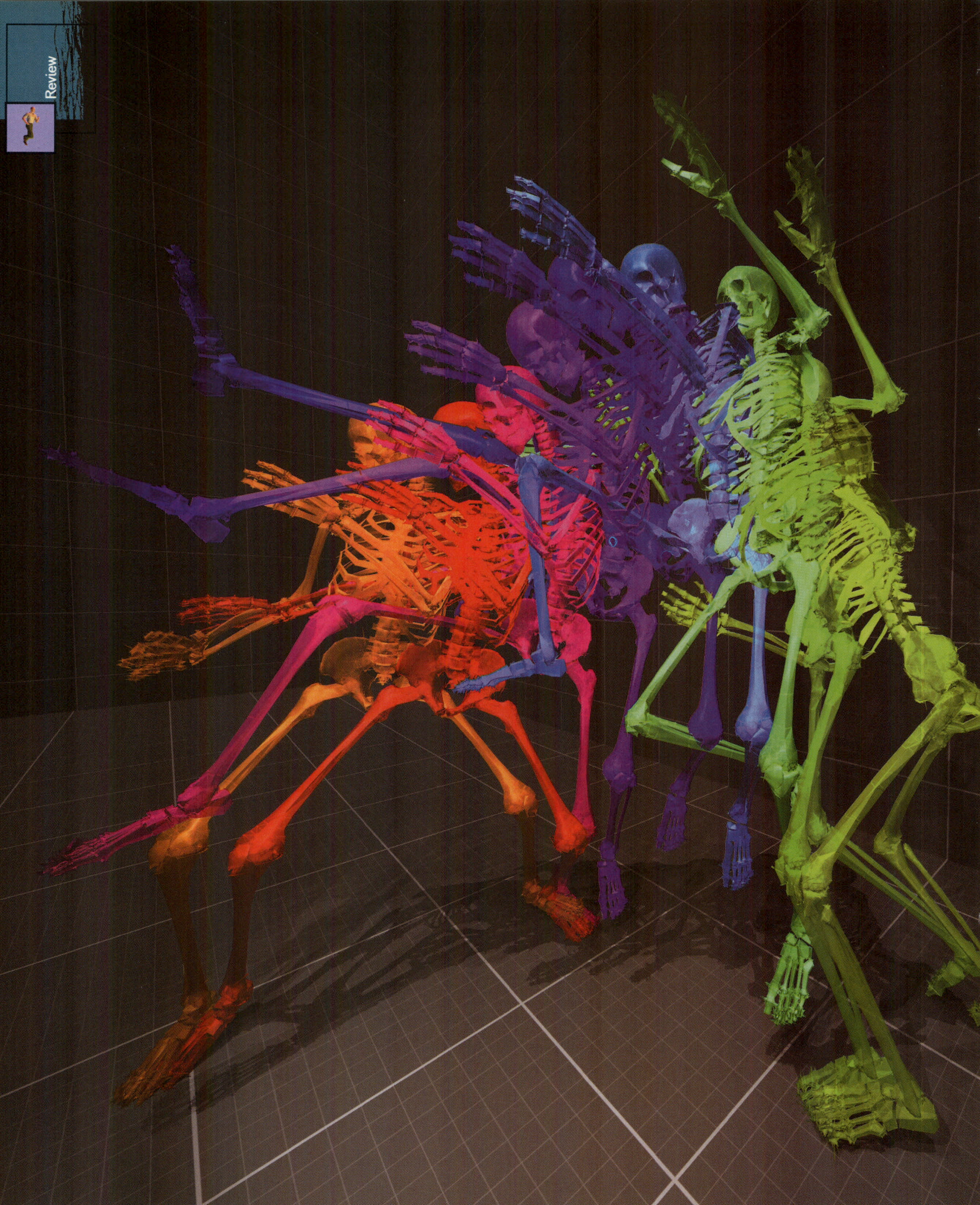
7 Open the Project Settings dialog and change the Maximum frame to 84. Move to frame 0, select all of the IK target sequences and the two Root bone sequences. Then select Sequences/ Divide from the timeline and divide them at frame 0. This detaches the initial -1 frame.

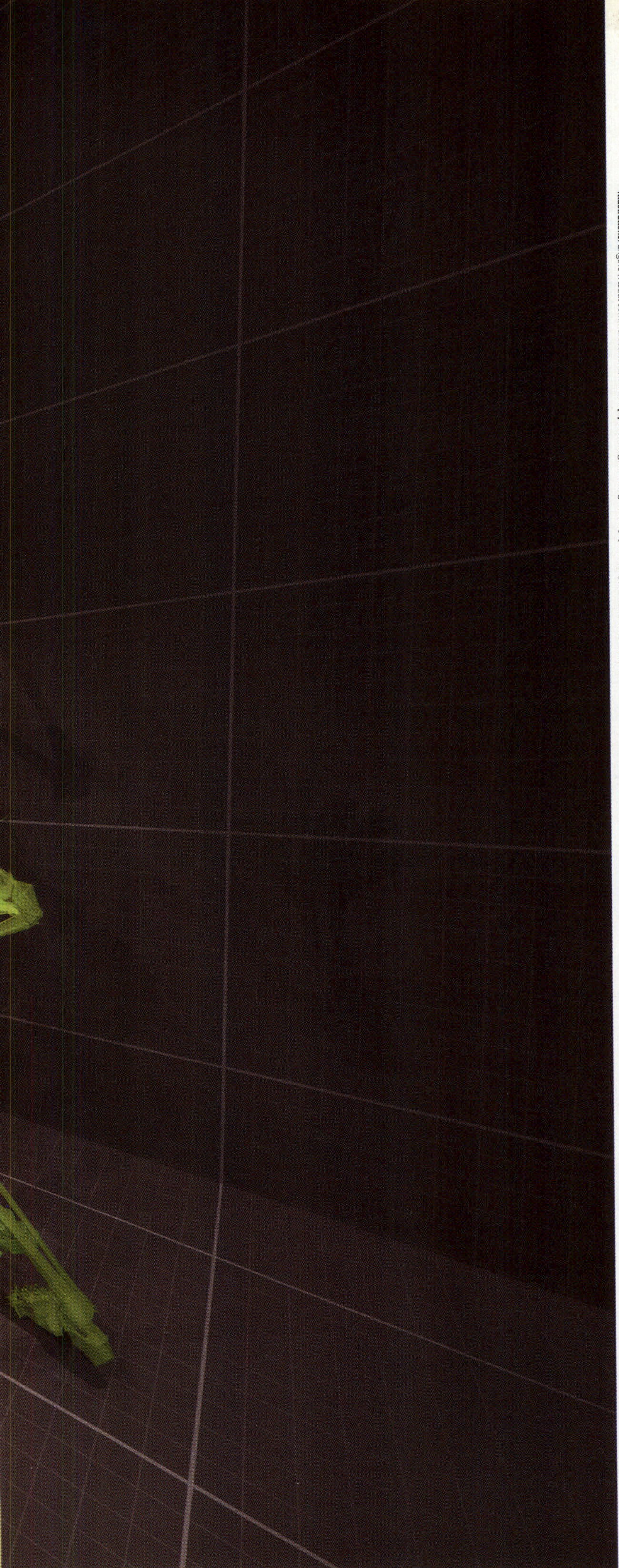


8 Expand the timeline, select the right-hand sequences and copy them to frames 29->57. Delete all the keys at frame 29, reselect the new sequences and select Sequences/Adjust. Now move them all one frame to the left – back to frames 29->56. Now you can copy this new set as many times as required. Note that the background will be out of sync and can now be turned off.



9 If desired, create a repeating loop for the cogwheel (first record a key at frame 1 and repeat the last two steps for it). You can now render the desired number of frames, or take the animation further by making the sequences more natural with a Time Curve. See the movie WalkCycleFinal and a full character, Septic Jones on your cover CD.





Illustrations: Engine (visual communications) limited **[e]** info@engine-design.co.uk **[w]** www.engine-design.co.uk **[t]** 01604 453177

Software round-up

Whether you're an aspiring animator or an established pro, our guide to some of the best animation software out there is nigh-on essential…

The word 'animation' covers a wide range of software. It also covers a wide range of interests and occupations. But, however you look at it, choosing the right software for the right job can be one of the trickiest decisions there is. Do you blow your budget on a high-end 3D tool such as *Maya* or *Softimage|XSI*? Or, do you save your pennies and reach for a cheaper option such as *Cinema 4D XL 6*? Also, if you're a Web animator, although choices are reasonably limited, you'll probably want to know the benefits and limitations of certain software.

When it comes to the crunch, it all depends on exactly what you need from your tools. If you're going to be creating animations destined for the big screen, you may need to splash out, say, nearly ten grand (big production houses certainly wouldn't think twice about doing this). If you're working on a project for yourself, or destined for the Web, you can probably get away with a budget of less than £2,000.

Whatever you're into, take a look at the next four pages and weigh up which software suits your exact needs, we've taken a look at 12 of the best animation tools out there. ➤

After Effects 5

Adobe's effects package is updated with 3D animation and *Flash* output…

Price

£617, upgrade £182
Production Bundle £1,439, upgrade to Production Bundle £269

Company

Adobe

Telephone

020 8606 4000

Website

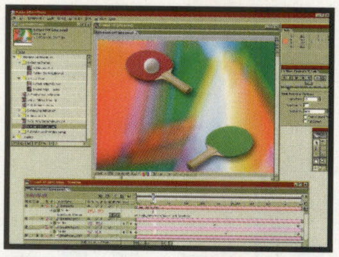
www.adobe.com

System

PC: Pentium II • 128MB RAM • Windows 98/2000/ME

Mac: PowerPC • 64MB RAM • Mac OS 9.04+ or Mac OS X Classic

After Effects 5 established itself as virtually the only low-cost video effects package years ago. However, recently it has come under increased pressure, most notably from Pinnacle's *Commotion* and Discreet's *combustion*. The rise of the Web as a medium for TV-style effects has opened up avenues for animation designers.



Some have even found ways to convert bandwidth-intensive video animations into more Web-friendly formats. And with *After Effects 5*, things are even easier. In addition to exporting still sequences and video files, you can now render projects as *Flash* files. Of course, there's a lot in *After Effects* that *Flash* can't handle, so you have to know what you're doing.

After Effects isn't trying to become a video-painting package like NewTek's *Aura*. So you can't clone, or use natural media brushes to treat each frame as a still image. That said, Adobe does plan to include the ability to load and manipulate AVI files in *Photoshop* soon.

In its latest version, *AE* has to some extent become a 3D package. The stills and video shots you're working with are obviously just 2D planes, but with *v5* you can manipulate them in true 3D. The 3D Layers tool will be useful to almost everybody. The new Parenting and Expressions tools add depth and flexibility to complex animations, and the new filters, if a little gimmicky, are all pretty useful.

The ability to save animations as *Flash* will open the package up to a new set of users, and the increased fusion between the Adobe suite of programs will smooth workflow. The video paint option is a little half-hearted, however, on balance *After Effects 5* will retain its place on the desktops of anyone involved in motion graphics and video.

Verdict

★★★★⯪

Poser 4.03

Under new management, *Poser* is back…

Price

£234 (upgrade £100)
Free upgrade from v4

Company

Computers Unlimited

Telephone

020 8358 5857

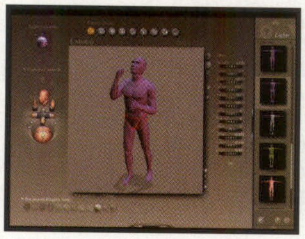
Website

www.unlimited.co.uk

System

PC: Pentium • Win 9x/NT 4 • 32MB RAM • 400HD

Mac: Power Mac • Mac OS 8 or above • 32MB RAM • 400HD



Aimed at novices and pro users alike, *Poser* offers a wealth of options for creating animations and images based on human (and not-so-human) figures.

This new release features almost 100 fixes, improvements and new features, including full MetaStream output for *Poser* figures – something that was in beta during the last release, so you can get interactive *Poser* content online quite easily.

The MetaStream format from MetaCreations (now Viewpoint) is its bid as the standard in online 3D content delivery, though you can output work in VRML format. OBJ exports work better than before and properly report export progress. Motion files can be exported as BVH files, so you can transfer *Poser* animation to other 3D apps for rendering more cleanly than before. An attractive choice for those wanting a versatile figure design and animation system.

Verdict

★★★★☆

Flash 5

So what has the latest version got to offer?

Price

£259

Company

Computers Unlimited

Telephone

020 8200 8282

Website

www.macromedia.com/flash

System

PC: 133MHz Pentium • Win 9x/NT 4/2000 • 32 RAM • 40MB HD

Mac: PPC • Mac OS 8.5 or later • 32 RAM • 40MB HD

With *Flash 5*, not only do we get a reinvention of ActionScript that brings it closer to JavaScript syntax, we also get a major interface redesign and several new workflow tools that could change the way you use *Flash*. Improvements to its scripting capability and enhancements in connectivity, notably through the addition of XML support, make *Flash 5* the first true client-side app development tool for the Web.

The Movie Explorer, which categorises and organises movie elements into a hierarchical structure is another significant addition, as is the ability to format text using HTML, complete with hyperlinking. The program that started as a package for creating animations to embed in HTML has become a tool that you can embed HTML into. *Flash 5* makes updating movies on the Web or connecting them to external data sources about as easy as it can possibly be.

Verdict

★★★★⯪

3ds max 4

New character animation tools and a significant update for this 3D tool

Price
£3,166 (upgrade £699)

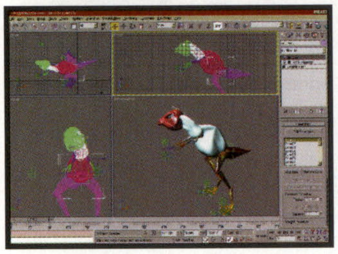
Company
Discreet

Telephone
020 7851 8000

Website
www.discreet.com

System
PC: Win 98/2000/ NT • 300MHz pentium• 128MB RAM • 1,024x786 graphics card

When you first open *3ds max 4*, the first thing you notice is that it's changed colour. The toolbars and palettes are now dark grey instead of light grey which makes the package look more like Discreet's post-production tools *flame*, *inferno*, and *combustion*. *Max* is often seen as a tool primarily for games design but Discreet would like to enable *3ds max 4* to challenge the likes of *LightWave* and *Maya* as the 3D tool of choice for post-production. In release 4, the package is firmly integrated with *combustion*, making it easy to port projects from one package to the other.



Discreet has introduced a range of features to make this a major update. A key one is character animation. The whole IK system has been replaced, and animation tools have been introduced to enable you to give your characters complex animation. The various morphs defining facial expressions can be set up as a 2D representation of the face ready for you to drag around, or the fingers of a hand can be opened and closed using a simple slider.

On the downside, there's no facility for modelling hair and no metaball modelling tools. The Fire-producing tool Combustion (renamed Fire) produces decent enough flames, but still doesn't compare to other plug-ins like Pyrocluster.

Having said that, the IK and character animation tools are incredible. *3ds max 4* is bound to assure the product's future on the shelves of every game designer. As 3D emerges on the Web, *max* looks ready to follow whichever way the technology goes. As far as the broadcast and film markets are concerned, integration with *combustion* and *max*'s powerful toolset should see production houses using the package more in the future.

Verdict
★★★★☆

Character Studio 3

Crowds gather as bipeds walk on all fours…

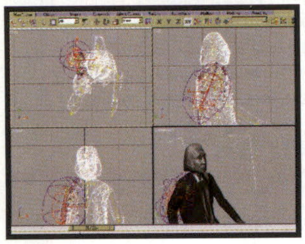
Price
£1,169 (upgrade £464)

Company
Discreet

Telephone
020 7851 8000

Website
www.discreet.com

System
PC: Win 98/NT 4 (sp3) • 128MB RAM • Pentium II 200MHz • *3ds max 3.1*



Character Studio has been the must-have add-on for *3ds max* since its inception. Version 3 comes with a raft of new features and performance enhancements, as well as some subtler tweaks.

The biggest addition is its handling of crowd simulations. You can now have dozens or hundreds of bipeds walking about in a semi-controlled way, although solving the motion paths has to be done multiple times so that the creatures don't collide.

Character Studio's more traditional functions have also been improved. You can now give any part of the biped the same IK features as any other, including animated pivot points to create 'multi-legged bipeds'. Overall, this is a massively powerful tool that will find a myriad of uses. Physique is faster, and freeform and footstep animation have been streamlined, although a complete multi-legged footstep animator is still some way off.

Verdict
★★★★☆

Softimage|XSI

Softimage|3D's successor XSI is finally with us

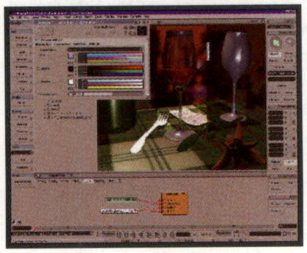
Price
XSI Essentials $7,995
XSI Advanced $11,995

Company
Softimage

Telephone
01753 655 999

Website
www.softimage.com

System
PC: Intel Pentium PC • Windows 2000/NT 4/IRIX 6.5.2 • 128MB RAM



The successor to the exceptional *Softimage|3D*, *XSI* doesn't so much replace *Softimage|3D* as complement it. It's easier to use though, and simple to modify. It's not too shabby feature-wise, either. The Animation Mixer, for instance, provides designers with NLA (Non-Linear Animation) and enables you to store the function curves into single, easy-to-manage packets called actions.

Admittedly, there are niggles – particularly with functions like the new object manipulators. The B key toggles visibility on/off, but instead of an axis 'gnomon,' you get a bounding box with spheres at each vertex, and it's awkward to use. Furthermore, you only get a handful of modelling tools – one of the reasons why *Softimage|3D* is bundled with *XSI*. *Maya* has hogged the podium for some time, but you can't help but be impressed by *XSI*. A good price, great features and *Softimage|3D 3.9* is thrown in for good measure. ➤

Verdict
★★★★★

Maya 3

PC

Can the latest release of Alias|Wavefront's acclaimed 3D app really measure up?

Price

Complete £6,991
Unlimited £15,216

Company

Techex

Telephone

01628 777 800

Website

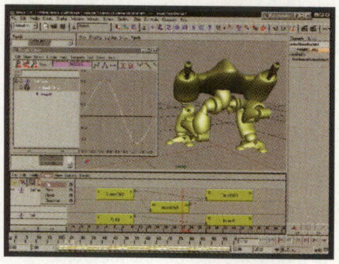
www.aliaswavefront.com

System

PC: Pentium • NT4 • 128MB RAM • Qualifying OpenGL graphics card

Mac: *Maya Complete 3* for Mac OS X is scheduled to ship in June 2001. See the Web site for details

While it seems to take most developers years to develop and debug new versions of their software, Alias|Wavefront produces release after release of its acclaimed 3D package *Maya*, year in year out. While there are fewer new features in this version than previous upgrades, Alias has made significant inroads into crushing bugs, improving usability and making the overall *Maya* experience much more pleasurable, particularly to new users.



Not to be out-done by *Softimage|XSI*, Alias has developed its own non-linear animation system dubbed Trax. You use the Trax Editor to create a single sequence which contains all (or part) of the animation of a character. This sequence is displayed as a solid bar in the Trax Editor, which you can drag to resize. It's an excellent effort by Alias to thwart *XSI*'s NLA. It works very well, but perhaps isn't as slick as *XSI*.

Both Unlimited and Complete versions of *Maya 3* come with 9999 batch render licences. Previously you had to pay for additional licences for each machine the Maya Batch renderer was running on. Now, with this universal rendering policy, a single seat of *Maya* can power an entire render farm of up to 9999 CPUs. The implications of this are far reaching, bringing the awesome power of *Maya* within the grasp of many smaller 3D companies.

Maya is now easier to use, cheaper and more flexible. It isn't perfect though: there's no radiosity or caustics and the renderer is quite slow. Competing packages such as *Softimage XSI* better *Maya* in specific areas, but as a whole *Maya 3* leaves the competition behind.

Verdict

★★★★★

Premier 6

PC Mac

Web export options and After Effects plug-ins

Price

£480 (upgrade £163)

Company

Adobe

Telephone

020 8606 4001

Website

www.adobe.com

System

PC: 300MHz Pentium • Windows 98 SE/ME/2000/NT 4 with sp6 • 32MB RAM

Mac: PowerPC • OS 9.0.4 • 32MB RAM

Adobe *Premiere* has been one of the big players since the first days of desktop video editing and *Premiere 6* is a major update. There's a raft of new features, and many of the familiar ones are more interactive. It's pursuing the DV market with some determination, while giving video for the Internet a boost with its new Realmedia and ASF output tools.

The rewritten Capture tools, which now work with any IEEE 1394 capture card, should enable you to buy inexpensive capture hardware without the need for third-party driver software. The updated video filters are a great help and the ability to use *After Effects* filters will be an advantage to anyone who has to keep swapping files from one app to another.

Some new functions, the Storyboard window, for example, might prove pointless for many professional users. However, this new release should keep *Premiere* well ahead of its rivals.

Verdict

★★★★☆

Cinema 4D XL 6

PC Mac

This pretty number packs one hell of a punch

Price

£1,395 upgrade from V5 £349

Company

Hisoft

Telephone

01525 718 181

Website

www.cinema4d.com

System

PC: Pentium • NT 4, Win 9x • 64MB RAM

Mac: PowerPC • Mac OS 8+ • 64MB RAM

Version 6 of *XL* is busting with new features, tools and workflow enhancements and it's almost totally devoid of the clumsiness of previous versions.

The modelling side of things has been revamped: what you now have is a modelling 'pipeline' that gives you a non-linear construction history – it may seem complex at first, but there are advantages further down the line.

The animation system is better than before, sporting a new timeline and better controls. The big feature, though, is Motion Sequencing. An animation track can be converted into a single Motion track, and an object can have any number of these Motion 'layers' which can be overlapped and blended to produce synthesised motion.

XL 6 is well worth the upgrade price of £349. The full price is now £1,395, but it is still cheaper than both *LightWave* and *max*. A top-quality package with few compromises.

Verdict

★★★★★

LightWave 6.5

Motion Designer 2000 and a new Particle system enhance NewTek's upgrade

Price

£1,879 (free upgrade from *LightWave 6)*

Company

Gomark

Telephone

020 7731 7930

Website

www.newtek-europe.com

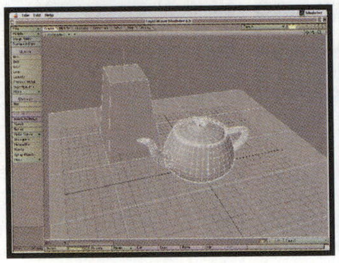
System

PC: Pentium • 64MB RAM • 15MB HD • OpenGL card

Mac: PowerPC • 64MB RAM • 15MB HD • OpenGL card

Newtek has a habit of bringing out lacklustre versions of its software, only to then release a cracking upgrade. Version 6 of the 3D animation powerhouse was a major breakthrough, with a framework that enabled speedier deployment of the new features. But the package wasn't as good as users expected it to be, and the Mac version was dire. Now here's the 6.1 upgrade – itself upgraded to version 6.5.

So what are the highlights? Well for a start, Newtek has reorganised interfaces and found homes for all the plug-ins that used to reside in the lengthy pop-up menus, in Modeller especially. New Tabs grace the tops of each program's interface, and the toolbars feature buttons and pop-ups for the tools. At first it's confusing, but you can create your own layout.



Modeller has some excellent new tools, including Rail Bevel, which you can use to control the profile of a bevel using a background curve. There's also a Snap tool that works like the Drag tool, but adds enables you to snap to other points on an object.

Two of the best new features are Motion Designer 2000 and the Particle system. Previously, particles in *LightWave* were a pain, requiring loading data files for plug-ins and poor previewing, among other things. However, they're now totally integrated and fully interactive.

Both Mac and PC versions are on a par, with the Mac version being more stable and the PC version more solid, which is remarkable considering the quantity of new features. There are still quirks and annoyances, but all in all Newtek has done the business.

Verdict

★★★★½

Director 8

Stronger Internet content and lower bandwidth

Price

£939

Company

Computers Unlimited

Telephone

020 8358 5857

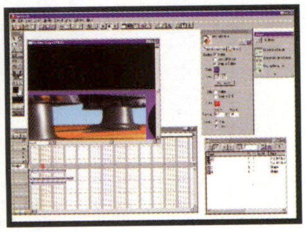
Website

www.macromedia.com/uk

System

PC: 200MHz Pentium • Win 98/NT 4/2000 •64MB RAM •100MB HD

Mac: 180MHz PowerPC • Mac OS 8.1+ • 64MB RAM •100MB HD



Macromedia's *Director* has been sitting pretty at the top of the multimedia authoring tree for some time. With *Shockwave* rapidly becoming the multimedia face of the Web, the company has introduced new features for improving content and reducing bandwidth.

The most significant improvement is the Properties Inspector. This replaces many of the dialogs you previously had to sort through to locate information. You can now alter your sprite's Colour palette, Ink type and so on in one box.

Fireworks 3 is included in the *Shockwave Internet Studio* package, and *Director* is better integrated with it. *Director*'s Web creation options aren't a realistic replacement for a decent Web design tool, but they can help if time is short, or if the non-Shockwave content of your page is small. All in all, there are many additions that will free users from old constraints, as well as simplifying work on complex projects.

Verdict

★★★★☆

Strata 3D Pro 3.0

The latest plug-in-boosted reincarnation...

Price

£517

Company

Strata/3D.com

Telephone

020 7731 7930

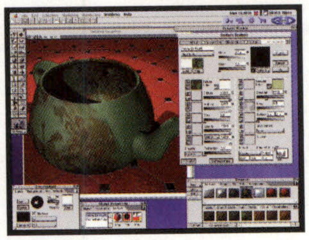
Website

www.strata.com

System

PC: Win NT 4/2000/98 • Pentium PC • 64MB RAM • 64MB HD • *QuickTime 3* • OpenGL • IE 4

Mac: OS 8.5 • *QuickTime 3* • 64MB RAM • 64MB HD • OpenGL 1.1.2 • OpenTransport



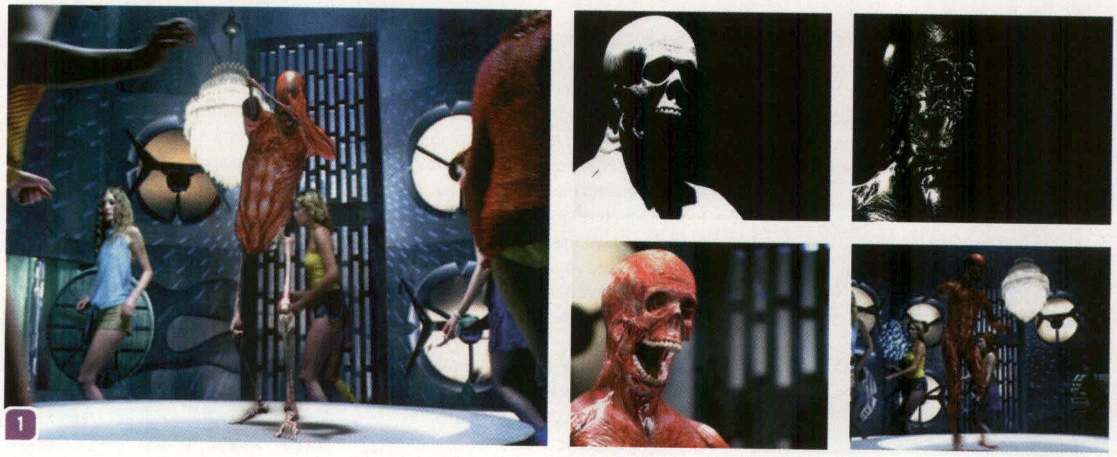
Dubbed the 'professional' version of *Strata 3D*, *Strata*'s latest offering is effectively *Strata Studio Pro 3*. It's identical to *Strata 3D* in every way, except that it ships with many of the plug-ins which used to be part of the Power Modules pack, and at a much reduced price.

Unfortunately, those familiar with previous versions of *Strata Studio* will find few surprises. The interface and usability remain largely unchanged as do the clunky View Manipulation tools. With most professional 3D apps taking the single-window approach, *Strata*'s antediluvian interface feels clumsy.

There are some good features: interactive Bézier bevels for extruded text and excellent quality rendering. Indeed, when it comes to making pictures, you can't really fault it. *Strata 3D Pro 3* isn't an ideal 3D solution, but in a wilderness of mid-range programs, it boasts enough redeeming features to make it worth a look.

Verdict

★★★½☆


1

2
Toffee
Ambrosia
Splat!

Clear

The market for 3D animation is booming, according to Clear's John Harvey: *"Over the last year we've seen a marked increase in it. Everyone wants a bit of CG in their work..."*

With the advent of digital satellite television, the demand for 3D special effects has gone ballistic over the last year. It's not just a demand for channel idents either. Advertisers, sponsors and programme makers all seem to want some CG in their work at the moment, and companies who can produce effects on deadline and to budget are lapping up the contracts. Companies like Clear.

This Soho-based production facility made its name as a compositing studio and has a burgeoning 3D animation wing. Led by head of 3D John Harvey, the team's best-known project to date was Robbie Williams' Brit Award-winning *Rock DJ* video.

Though the director went up to collect the gong, Clear was the company behind the scenes which created an all-singing, all-dancing Robbie Williams skeleton in 3D, and composited the FX together with the video footage to create a seamless piece of pop promo history.

From the point in the video where Robbie ducks his head down and bobs back up again in skeletal form, Clear's 3D work is on parade. The main package used for the animation was *Softimage*, though *Houdini* was used for some of the modelling.

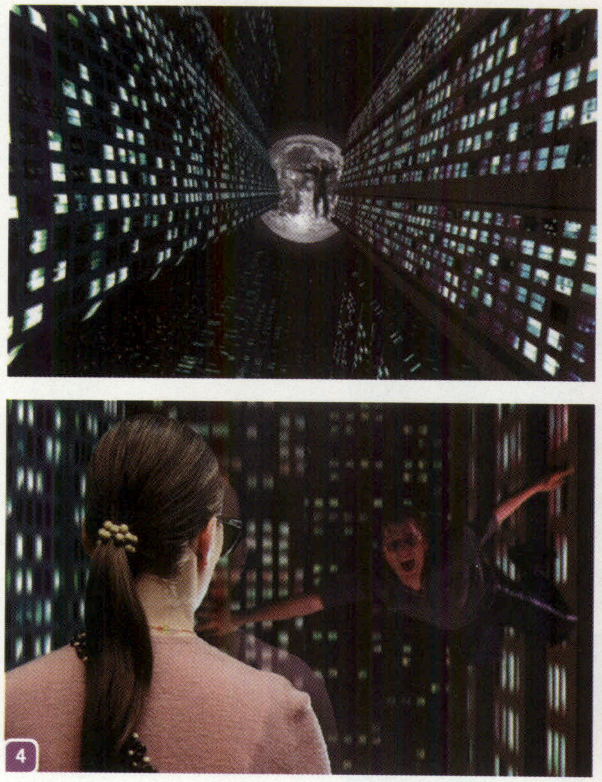
Although the company normally does its own modelling, in this instance a Viewpoint model of a human skeleton was bought for the job. "We bought it in as a base model, and we rebuilt it from the ground up so that it would work with Robbie. That was a lot of scaling for proportion. The actual muscle configuration was different to the one we received. We took it into *Houdini*, and turned it into NURBS so that we could manipulate it really easily." ➤

1. Rock DJ – The main image shows Clear's dancing skeletal Robbie Williams in a finished frame from the video. Included also is the death's head version of Robbie's skull in various stages from wireframe to full composite. *Softimage* and *Houdini* were used for their animation and modelling prowess, respectively.

2. Though Clear doesn't specialise in a great deal of character animation, the company worked on this Ambrosia Splat work for the company's sponsorship slot on SMTV. The Pokémon-influenced little fella is fried in a pan and then explodes.

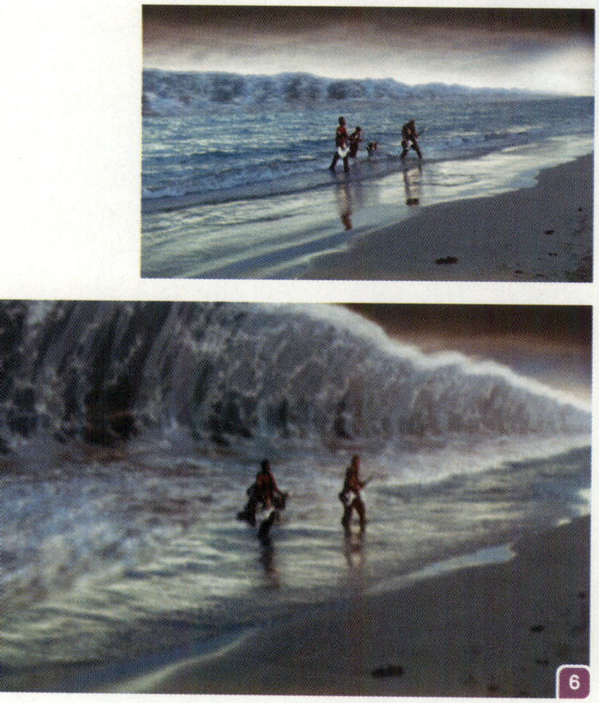
3. A1's *Take on Me* promo was created by Clear with the band being shot on bluescreens then composited into a futuristic 3D environment which drew on both *Tron* and *The Matrix*.

Feature by Garrick Webster
[e] garrick.webster@futurenet.co.uk



4. Pop promos are an area of expertise for Clear. These images are from the video for Embrace's *Save Me* promo. The girl is in a lift inside a building, looking on as the lead singer falls between 3D skyscrapers.

5. *All Good Nikes go to Heaven.* This test ad was developed at Clear for the sportshoe company. The shoes, which get buried in someone's back garden, are animated with 3D flapping wings and ascend to the big Nike symbol in the sky. Clear did the 3D and compositing work on the commercial.



6. The promo video for Feeder's *Seven Days in the Sun*. Clear created a tidal wave to wash away the band at the end of the promo. Dan Seddon of Clear used *Houdini* to create and animate this wave.

Based on the information received from the people dealing with the prosthetic muscles worn by Williams during earlier shots, Clear was able to proportion the skeleton to suit the singer. The animators were no less scientific when it came to the movement of the dancing skeleton. This was motion captured from Robbie Williams by the mocap experts at Audio Motion.

Trouble was, there was a tight turnaround between the time the motion capture data was delivered and the deadline for the promo. So Clear planned for a system whereby the information could be imported and the character animated more quickly. "We'd get the data back and make sure we had to turn it around in about a day, so we had to have a kinematics system so that we could swap data really, really quickly between the models," says John. "So I basically had three weeks with Audio Motion developing a new way of doing it."

The end result was impressive and realistic enough to become the target of the sensors but Harvey thinks that given more time the promo could have been made more realistic. Though *Rock DJ* is Clear's best known work to date, the company has an array of other clients. In the pop video industry the company has worked with Embrace, Grandaddy, Muse and A1. In fact, the *Tron*-and-*Matrix*-inspired video for *Take On Me* was produced at the same time as *Rock DJ* but, despite its motion-tracked cameras, bluescreened band and 3D environments, it didn't capture so much interest.

Aside from music, the company does all kinds of commercial and content work. Clients include Nike, the BBC and Ambrosia. For the latter, Clear has created the *Yummies*. These little characters feature in Ambrosia's sponsorship slots on the SMTV programme, presented by Ant and Dec on ITV. "They're sort of Manga-ish Pokémon characters who die in horrible ways," says John.

As we write this profile, the studio is busy with another interesting advert – for the *Guardian* newspaper. This time, *Houdini* is the chosen app thanks to its prowess in the field of procedural, maths-based animation. "It's a city that is built up out of newspaper. So the papers unfold and they eventually build up an entire landscape and city. That was particularly good for *Houdini*. It would have taken quite a while to do that in *Softimage* because it would have been instances and it would have taken a hell of a lot of work, but with *Houdini* you can run expressions and generate it that way, on a point per point basis."

This kind of attention to detail when it comes to creating things in 3D is probably one of the hallmarks of Clear's work. One new technique they are working on is face replacement: tracking a face and replacing it with another one. The company has also acquired *ImageModeler* by RealVIZ, a photogrammetry application that can turn a series of photographs of an object or environment into a 3D mesh. This software, in combination with a high res digital camera and an application that can handle global illumination will provide even more scope for its photorealistic work.

So what does the future hold for Clear? Having come from a motion picture background, John Harvey isn't keen on moving back in that direction. "I moved more towards this side because I like the fast turnaround. It's more of a challenge, to be honest. I know that a lot of people like working on films but I find it too long and drawn out," he says. And it's not a bad way of looking at it. After all, the team will be hiring a new animator soon, because the work just keeps on coming in. ca>s

For further information, contact head of marketing and PR Lucy Clay on **[t]** 020 7734 5557 or visit **[w]** www.clear.ltd.uk.

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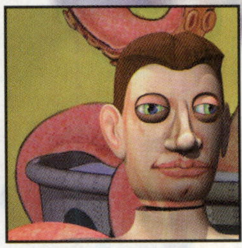

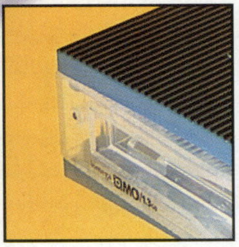

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Glossary *[animation]*

Confused by keyframes? Intrigued by IK? Or simply baffled by bones? Enhance your animation vocabulary with our glossary…

3ds max

The industry-prefered animation tool (according to Discreet anyhow). With version 4 sporting some awe-inspiring new features, it's not hard to see why it's the choice of 3D animators worldwide.
See *character studio*

After Effects

Adobe's compositing and effects tool. Included in version 5 are Expressions – a simple way to create animations without using keyframes. For the full review, go to **[w]** www.computerarts.co.uk/reviews.

Animated GIF

A somewhat dated (mainly due to *Flash*), yet still extremely effective animated file format. Used extensively on the Web due to small file sizes.
See *Flash*

Animation path

A path, often drawn using Bézier tools, that an object can be set up to follow – whether it be in 2D or 3D space.

Animation curve

See Function Curve

Bones

Bones are used to build an IK skeleton in order to be able to apply complex movements. Hence 'to bone a character.'

Cycle

A short series of images or frames that can be continuously repeated to make up an action such as walking, running or swimming.

Cel

The traditional term for what most of us know as a frame.
See Frame

character studio

Discreet's excellent character animation plug-in for *3ds max*. Check out the review of the third incarnation at **[w]** www.computerarts.co.uk/reviews.

Constraint

A constraint is an object or part of an object that's constrained to another object to keep it from moving.

Dope sheet

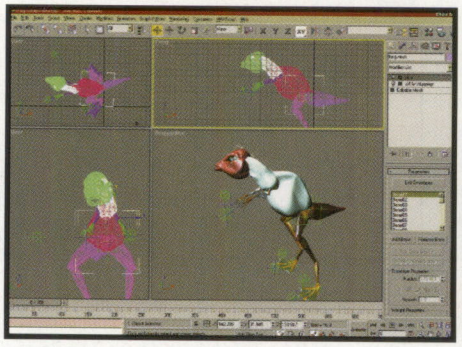
Used to record and keep track of all the individual frames within an animation, a dope sheet provides a systematic way for large teams to efficiently manage a project. Basically it's a form that holds info on camera angles, movements and so on for each frame. Essential when using complex animation techniques such as lip-syncing in high-end apps such as *Maya* and *Softimage|XSI*.

Deformation

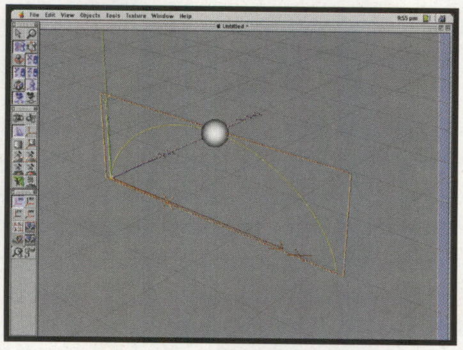
A method of transforming a 3D object's geometry – often over time – to create twists, bulges, bends and so on. Can be used to morph one object into another.

Dynamic simulation

A way of recreating friction, gravity and wind within animations.
See Soft bodies, Rigid bodies.



Regarded as one of the world's best 3D modelling and animation packages, *3ds max 4* is the chosen tool for games designers and animators.



When setting up complex movement, an animation path is essential to guide your character in the right direction. Simply draw a curve using the Bézier toolset and attach the object to it.

Dolly

Dolly refers to moving a camera to and from a specific target.

Ease in/Ease out

A technique used by animators to simulate natural movement. Simply put, to ease in is to make the animation decelerate before a keyframe, to ease out is to make an animation accelerate after a keyframe.
See keyframe

Exposure sheet

See Dope sheet, X-sheet

Forward Kinematics

The opposite to Inverse Kinematics, Forward Kinematic or FK, requires the animator to manually rotate each joint in a chain in order to give a character movement.
See Inverse Kinematics, joint, skeleton

Frame

An individual image that makes up part of the whole animation.
See Keyframe, Tween

Flash

Macromedia's revolutionary Web animation package. So popular, we often dedicate a whole magazine to it.
See SWF

Function curve

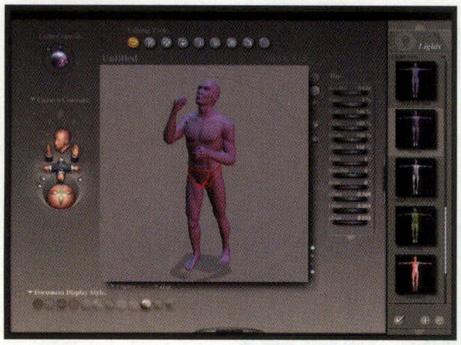
Also known as f-curve or animation curve. The speed of an animation can be precisely controlled using a function curve. Basically, the steeper the curve, the faster the animation. All high-end 3D animation packages include these.

FPS (Frames per second)

Simply put, the rate at which frames are displayed. The standard for the UK (PAL) is 25fps, whereas the standard for the US (NTSC) is 30fps.

Hierarchy

When modelling a character ready for animating, it's important to establish a hierarchy between all the separate elements. For example, if building a humanoid character, you would connect the hands to the arms, the arms to the body and so on. Most 3D apps nowadays



Curious Labs' popular character animation tool is a great place for any budding animator to start, and with the introduction of the *Poser Pro Pack*, professional animators could soon be reaching out for it.

enable you to apply IK to your characters once they've been assembled.
See Inverse Kinematics, Skeleton, Bones, Joint

Inverse Kinematics

Inverse Kinematics, or IK, is a way for an animator to give a character complex, realistic movements. Using a hierarchical IK chain, artists can simply animate the ends of a character (ie, the fingers, toes and so on) and IK will make sure all the intermediate joints move accordingly.
See Forward Kinematics, Joint, Skeleton, Bones

Interpolation

Describes the change of state of an object between two consecutive keyframes.
See Tween, In-between, Keyframe, Frame

In-between

See Tween

Joint

The building blocks of any IK skeleton, joints can have one or more bones attached to them. The bone is controlled by the joints' movement. Various limitations can be placed on a joint depending on the character.
See Inverse Kinematics, Skeleton, Bones

Keyframe

Think of a keyframe as a 'key' pose within an animation. These frames are often used to describe the most exaggerated movements of a character or object, with the interpolating frames creating the rest of the movement.
See Frame, Interpolation, Tween

LightWave

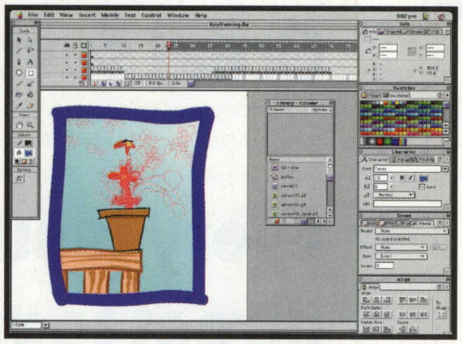
One of the most widely used 3D animation tools, the brand new *LightWave 6.5* brings a banquet of bug fixes. Reviewed at **[w]** www.computerarts.co.uk/reviews.

LiveMotion

Adobe's answer to Macromedia *Flash*. An *After Effects*-style timeline is at the heart of the package.

Maya

One of the big three professional 3D graphics and animation tools (the other two being *3ds max* and *Softimage*). Considered to be the best out of the lot and is also, unsurprisingly, the most expensive.



Coming from a traditional method of animating a character, onion skinning in such apps as *Flash* (pictured here) enables you to set up complex animations with the knowledge that all frames will be consistent in appearance.

Morphing

The process of two images 'melting' into one another.

Motion capture

Motion capture (or Mocap) is a way of capturing complex movement from a real-life source. This data can then be applied to CG characters and the like.

Motion tracking

Describes the process of matching CG animtion to live action footage. Used extensively in the motion picture industry. Time-consuming because every single frame needs to be tweaked in order to get good results. Tools of the trade include *Maya Live*, included in the nigh-on £17,000, *Maya 3 Unlimited* package.

Onion skinning

Coming from traditional cel animation, Onion skinning is a technique (used extensively in *Flash*) in which the animator can see the position of an object on one layer while drawing a new position on a translucent layer above. This makes for more natural movement.

Poser

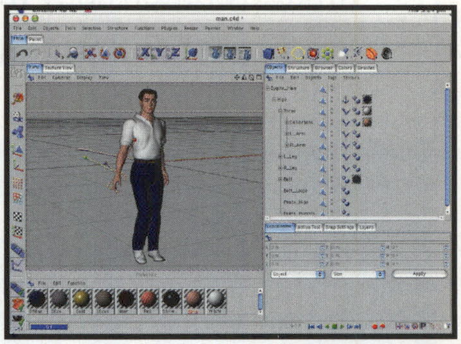
3D character animation tool from Curious Labs. The company has just released a *Pro Pack* of add-on extras.

Rotoscoping

A technique involving painting or drawing on top of film or video footage in order to create a special effect.

Rigid bodies

A Rigid body can be applied to a surface in order for the related object to collide with, rather than pass through another object during animation.
See Dynamics, Soft bodies



Inverse Kinematics is a standard way of animating a character's complex movement. Most modern 3D applications include this function, such as *Cinema 4D XL 6*, pictured here.

Softimage|XSI

Next-generation 3D animation application. Read the definitive review at **[w]** www.computerarts.co.uk/reviews.

SWF

Shockwave Flash – the file format that *Flash* exports to. Many more apps have adopted this as a standard export file format, including *After Effects 5* and the popular animation tool *Poser 4*.
See *Flash*

Skeleton

Exactly as the name suggests, a skeleton is the bare bones of a CG character.
See Inverse Kinematics, Bone, Joint

Storyboard

A series of ordered illustrations with the purpose of visualising an animation or story. Essential to any artist wanting to build a structured animation.

Soft bodies

The opposite of Rigid bodies, Soft body dynamics enable the animator to apply a more organic quality to an object as it animates. Often used for recreating the movement of such materials as cloth and fabric.

Timeline

Present in almost every, if not all, animation package out there, a timeline is a window in which you can set up, view, and alter how objects react over time. Sounds simple but the timeline is central to every animation.

Transition

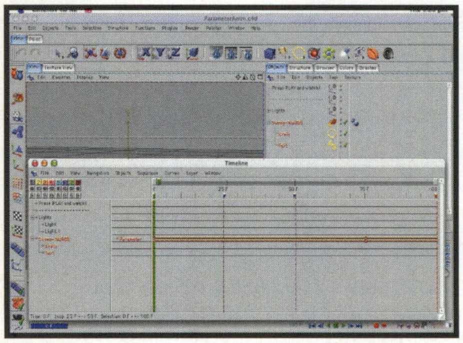
A way of moving from one scene to another, be it in the form of a simple fade or a (sometimes cheesy) wipe.

Tween or tweening

The process of automatically adding several frames 'in-between' keyframes to create smooth motion. Head animators would traditionally create keyframes and an 'inbetweener' would fill in the gaps.
See Keyframe

X-Sheet

See Dope sheet, Exposure sheet ca>s



Any decent animation app has one. Simply put a timeline is a dialog enabling you to view, add, delete or modify keyframes and frames within your animation extremely easily.

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Web Guide [Animation]

A plethora of animation resources and information lies in wait for the intrepid surfer. But, in case you haven't found them yet, here's a helping hand…

Animation companies/sites

Alternate Perspective Online

[w] www.ap3d.com/Alternate_Perspective.htm
Not only does this site showcase the impressive talents of Alternate Perspective, a company specialising in 3D graphics and animation, it also hands out some truly fantastic tutorials, including the rather splendid 'Building a better nebula'. Slick design and great usability completes the well-rounded package.

Aardman Animations

[w] www.aardman.com
With Wallace and Gromit, *Chicken Run*, and of course Morph, the icon of the Tony Hart generation, under its belt, Aardman Animations need no introduction. Simply check out the fun site for a look at some of the most inventive, amusing animation ever created.

Bazley Films

[w] www.bazleyfilms.com
For anyone trying to find their feet within the often complex world of *Flash* animation, Bazley Films is a great place to gain some inspiration. Get a grasp of the trials and tribulations of the medium by gazing at the making of The Journal of Edwin Carp – a *Flash*ed-up version of the 1954 book of the same name by Richard Haydn.

Blue Sky Studios

[w] www.blueskystudios.com
The official site of Academy Award-winning Blue Sky Studios is a great place for, if nothing else, checking out the company's exciting and dynamic portfolio. There's also a comprehensive archive of press releases about the company and an archive of events. Check this site out to see how the pros animate.

Cool Beans Productions

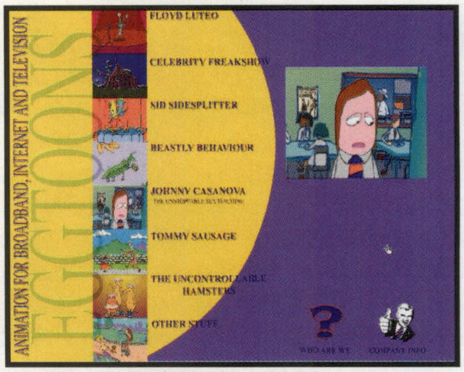
[w] www.coolbeansproductions.com
One of the UK's most visually dynamic CG and animation companies, Cool Beans Productions has a truly awe-inspiring portfolio. Take a look at the *Flash*-enhanced site and marvel as you try to work out just how the company did it. Downloadable desktop pictures and screensavers are an added boon.

Eggtoons

[w] www.eggtoons.com
If you're unfamiliar with Eggtoons, let us offer you a few reminders. How about Johnny Casanova (see the profile on page 50) – the first TV animation created entirely in *Flash*? Or how about *Beastly Behaviour* – an insight into the carnal activities of the animal kingdom… Watch sample animations online and have a chuckle at the sauciness of it all.

Pixar Shorts

[w] www.pixar.com/shorts/shorts.html
Toy Story, *Toy Story 2*… ring any bells? Well, behind every great animated feature film there is a ton of even better shorts. From the Academy Award-winning *Geri's Game* to the hilarious brand new Ralph Eggleston picture, *For The Birds*, Pixar's shorts are nothing short of true genius. And this is where you'll find out about them.



Creators of the world's first TV cartoon produced entirely in *Flash* – Johnny Casanova. Eggtoons is an entertaining site.

King of the Jungle

[w] www.kingofthejungle.co.uk
This is the home of King of the Jungle – a games company where the animation and CG is original, witty and perhaps more importantly, looks fantastic. Check out some of the company's previous projects including B-Movie on the PlayStation, and take a peek at its latest games project – Galaga: Destination

Slick design, interesting tutorials and great usability are the hallmarks of Alternative Perspective's Website.

The company need no introduction, and neither does its Website. See how the pros do it at **[w]** www.aardman.com.

Flying saucers, little green men, all the invader flick cliches are here in B-Movie. Dominate the skies and protect the earth from alien domination and then try your luck on their planet.

If you want to animate for a games company, check out King of the Jungle's site first to get a bit of background knowledge.

Extremely risqué in subject, but extremely well-crafted, all the *Flash* shorts at **[w]** www.monkeysrobots.com are a joy to watch.

Earth. There are also some rather splendid goodies to download.

MonkeysAndRobots

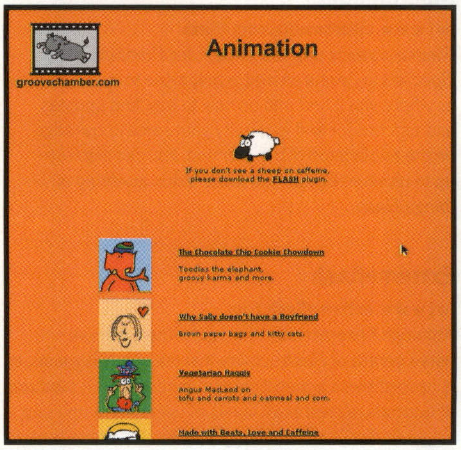
[w] www.monkeysrobots.com
Home of some rather kitsch and ever-so-slightly risque *Flash* shorts such as *Sheriff Hippo* and *Elderly Steve*, MonkeysAndRobots is a witty and compelling site. Proving that *Flash* is just as good at simplistic animations (á la *South Park*) as it is at interactivity, some of the toons here will provide a load of inspiration while at the same time giving you a damn good laugh.

Groove Chamber

[w] www.groovechamber.com
The Groove Chamber is another site full of ingenious *Flash* animations. From the ever-so-cute *Turtle Technology* to the strange, yet amusing *Vegetarian Haggis*, all of the toons here are slickly produced and overall incredibly watchable. You really do get the feeling that a lot of effort has gone into each individual keyframe.

AtomFilms

[w] www.atomfilms.com
The recent merger with Shockwave.com seems to have brought even more superb animation content to AtomFilms. Check out some of the most original and witty animations in the world, and, when you're confident enough, submit your own and wait for the call from Hollywood.


groovechamber.com

Animation

If you don't see a sheep on caffeine, please download the FLASH plugin.

The Chocolate Chip Cookie Chowdown

Toodles the elephant, groovy karma and more.

Why Sally doesn't have a Boyfriend

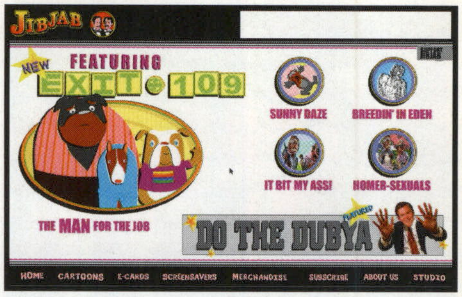
Brown paper bags and kitty cats.

Vegetarian Haggis

Angus MacLeod on tofu and carrots and oatmeal and corn.

Made with Beats, Love and Caffeine

Some crazy animations reside at **[w]** www.groovechamber.com – all produced in the ever-reliable *Flash*.



Wacky goings on from Jib Jab. Extremely amusing, extremely clever and over-all, extremely well made.

Jib Jab

[w] www.jibjab.com
Not only does Jib Jab create some great interactive *Flash* games, it also has a knack for producing some superb animated shorts. From the moment you load up the site you'll be impressed by some highly original, polished and entertaining content.

Useful resources

About Animation

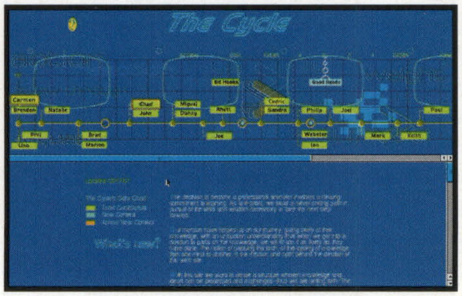
[w] www.animation.about.com
About's comprehensive animation resource is possibly one of the most comprehensive on the Web. With a detailed, illustrated glossary, heaps of tutorials as well as links to individual software packages, this is a wonderful place to browse and learn. Links to related animation sites complete the package.

The Cycle

[w] www.thecycle.com
Throwing all manner of topics up into the digital air, The Cycle is a haunt for professional animators wanting to comment on the state of the industry. Not the easiest of sites to navigate, but once you get past this, you have a valuable and extremely interesting resource.

The Art of Animation

[w] www.webreference.com/dlab/9904/
Another Web reference site, this time giving a fascinating insight into the principles of animation. Starting with basics such as shape, colour and texture, the article goes on to describe the more complex theories of animation. With links and cross references throughout, this is a great read for the first time animator.



A confusing design, but once you've got past this, **[w]** www.thecycle.com is a great place to air and share your views.

The Animation World Network is a positively bulging resource for all animators, whether they be into 3D or *Flash*.

Animation World Network

[w] www.awn.com/index.php3
The Animation World Network isn't far wrong in proclaiming itself The Hub of Animation on the Internet. With reviews, commentaries, job listings and other related features, this is one place that every animator should add to their bookmarks. Updated frequently, the site is thorough and easy to navigate.

CG-Char

[w] www.cg-char.com
With a subscriber base of 30,000 and counting, CG-Char is a site devoted to letting 3D artists and designers air their views on all things character animation and CG. Make sure you check out the excellent FAQ, where all of your character animation queries will almost certainly have been addressed.

CG Channel

[w] www.cgchannel.com
One of the most comprehensive resources on the Web for all manner of animation and CG-related software reviews, techniques and opinions, CG Channel provides an excellent starting block for wannabe animators. News and a variety of brain-stimulating features will keep the experts happy too.

3D animation

3D-Ark

[w] www.3dark.com
The 3D Ark is a positively bursting resource, full of tutorials, news, forums and more. Its down-to-earth nature coupled with practical, advice makes it the perfect place for aspiring 3D animators. There's also a thriving community on hand to answer any queries.

Computer Arts

[w] www.computerarts.co.uk
At our very own site you'll find a plethora of animation news, resources and tutorials. If 2D's your thing, be ➤

A fantastic resource for anyone interested in 3D animation and modelling. Lovely design and informative features.

sure to visit our Flash Studio at **[w]** www.computerarts.co.uk/flash for all the latest free downloads, tutorials and ActionScripts. If you're into 3D visit our 3D Studio (**[w]** www.computerarts.co.uk/3d) for a gaggle of free software downloads, plug-ins, tips and news.

Morph World 2.0

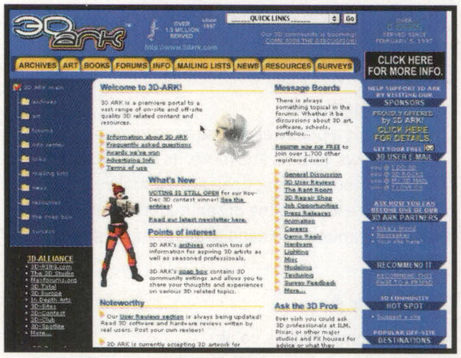
[w] http://morphs.bbay.com/html/tutorials.html
Morph World 2.0 claims to be the Web's largest site devoted to Morph Targets for *Poser*. We think it's probably one of the only ones. This doesn't mean isn't useful though, in fact, it's packed with downloads, tutorials and all sorts of down-to-earth advice.

Discreet

[w] www.discreet.com
Ah, *3ds max* – where would the animation and games industry be without it? For those of you unfamiliar with the package, make your way over to its manufacturer's site. Here you can take a look at release 4 and its awesome new animation feature set. You'll also find details of other Discreet products such as *Character Studio* – the company's character animation tool.

3D Cafe

[w] www.3dcafe.com
For any sort of 3D animation tutorials and info, whether your tool of choice is *3ds max*, *LightWave* or *Cinema 4D* there'll be something of interest for you at the 3D Cafe. There's a thriving community at the heart of the site and you can submit your animations for some healthy constructive criticism.


3D ark
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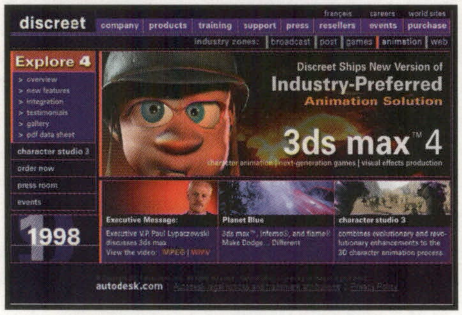
CLICK HERE FOR MORE INFO.
Welcome to 3D-ARK!
Message Boards
What's New
Points of interest
Noteworthy
Ask the 3D Pros

At 3D Ark you'll find a comprehensive list of tutorials, models and links, all aimed at making your life easier.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company products training support press resellers events purchase
Explore 4
Discreet Ships New Version of Industry-Preferred Animation Solution
3ds max 4
1998
Executive Message:
Planet Blue
character studio 3
autodesk.com

3ds max is regarded by most as the best 3D app there is. Find out about its awesome capabilities at Discreet's Website.

3ds max tutorials

[w] www.3dlinks.com/tutorials_max.cfm
A veritable banquet of *3ds max* tutorials and links resides at this site. Whether you're a beginner after some basic animation techniques, or a pro looking for that elusive snippet of advice, there's probably something here for you. From IK to Lip Sync-ing, the range and detail of the tutorials is tremendous.

Curious Labs

[w] www.curiouslabs.com
When Metacreations disbanded last year, the popular character creation and animation tool, *Poser* did not disappear. In fact, it went back to its original creators, Curious Labs. The home page offers info on *Poser*, as well as a thriving community and a superb gallery.

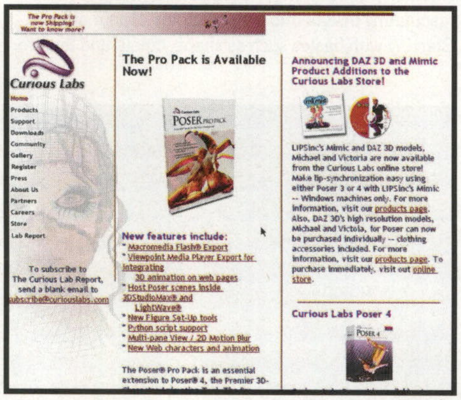
3D Animation on the Web

[w] www.webreference.com/3d
Delivering some practical and extremely interesting advice on how to go about creating the perfect 3D animation, WebRef's site is a great place for beginners to plot their first foray into the subject. Advice on software and hardware, as well as in-depth reviews make this great place to start.

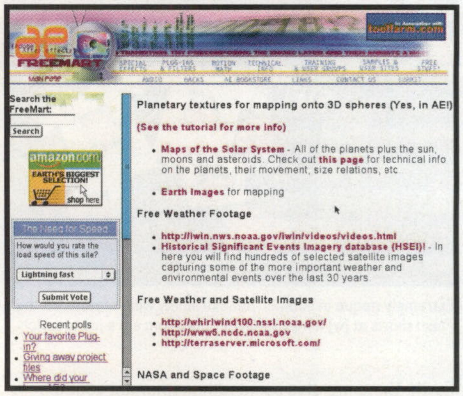
2D animation

Flash Kit

[w] www.flashkit.com
If you use *Flash* and you haven't been to FlashKit then there's no other way to put it – you are seriously missing out. Chock full of tutorials, downloadable FLAs and links to some of the most useful *Flash* resources, this should be top of any *Flash*-aficionado's bookmarks. Updated daily, you're sure to always be on top of the latest *Flash* developments.


Curious Labs
The Pro Pack is Available Now!
Announcing DAZ 3D and Mimic Product Additions to the Curious Labs Store!
New features include:
Curious Labs Poser 4

The home of *Poser*, Curious Labs' site is a great place to learn about its character animation package.


FREEMART
Search the FreeMart:
amazon.com
Planetary textures for mapping onto 3D spheres (Yes, in AE!)
Free Weather Footage
Free Weather and Satellite Images
NASA and Space Footage

A resource for all *After Effects* users, this 'freemart' is simply a great place to see what's going on in the *AE* world.

Adobe

[w] www.adobe.com/products/aftereffects
The home of *After Effects*, Adobe's dynamic media and animation package. Here you'll not only find information on how to get your hands on the latest version (recently upgraded to version 5) but details on training, related products and links to user forums. There's also a gallery showing just what's possible.

After Effects Freemart

[w] www.aefreemart.com
As the name suggests, After Effects Freemart is rammed full of free *After Effects* resources. If you're pining for free downloads, information on training and user groups, plug-in filters, books, special effects and virtually everything else *AE*, then this is the place for you. Links to other *After Effects* sites will also please.

Macromedia

[w] www.macromedia.com/flash
Flash is already popular enough for *Computer Arts Specials* to devote an entire magazine to it, and this is where you'll find info on how to buy, find updates and patches for and generally gain some knowledge on the application of the moment. You can also sign up to receive regular newsletters documenting all things *Flash*.

Extremeflash

[w] www.extremeflash.com
Although Extremeflash is not quite the intensive nerve centre of *Flash* activity that the name suggests, it is nevertheless a useful animation resource. A plethora of tutorials (aimed at all levels of users) fonts and clip art await the *Flash* info-hungry surfer. A comprehensive links section points you to some of the best *Flash* resources on the Web. ca▸s

The A–Z of animation

Digital Character Animation 2, Volume 1 – Essential Techniques

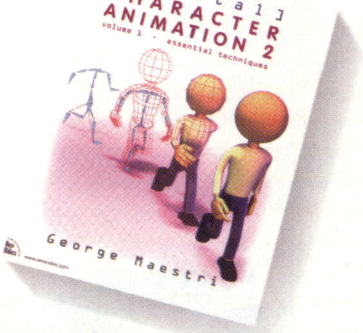
Price	£38.32
Author	George Maestri
Publisher	New Riders
ISBN	1562059300

Animation is the art, computers are only the medium," states George Maestri, whose book *Digital Character Animation*, published in 1996, is widely regarded as one of the best guides to 3D animation. This is the first of what should prove to be a defining series of manuals on every aspect of the animator's art.

Beginning with the basics of character animation, you see how the skeleton is built, with more detailed information on mesh deformation. This chapter has been expanded since the previous edition, emphasising the importance of this basic technique. More information is included on how to handle the rendering of heads and hands as well as essential guidance on metaball designing and NURBs.

Over and above the new and updated information, chapter nine on walking and locomotion is still one of the best tutorials you'll ever read on the subject, and worth the purchase price alone. Animation by definition isn't a static medium and this chapter explains how to move your newly designed characters and give them life. Together with chapter ten on facial expression and dialogue, this is one of the best animation courses money can buy.

The CD includes AVI and *QuickTime* movies of lip-sync examples, and should inspire your next character design to take a massive step forward in its perceived reality.



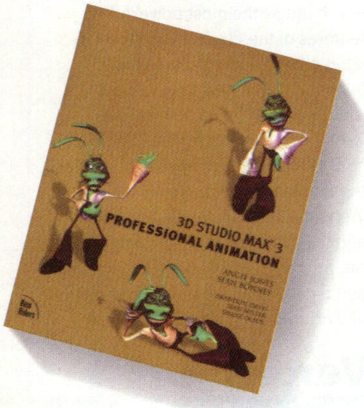
Verdict

★★★⯨☆

Mighty Max

3D Studio Max 3 Professional Animation

Price	£38.32
Authors	Angie Jones & Sean Bonney
Publisher	New Riders
ISBN	0735709459



This is a well-rounded tutorial-based manual that teaches how to use *3ds max*, and provides insightful chapters that will make your next creation come to life.

Divided neatly into three sections, the manual covers all of the main animation techniques in-depth. The author explains how to use *max 3*'s powerful features for character design, and how to handle this character within a realistic environment. Camera positions and lighting are also included to round out your design skills.

Tutorials include how to handle muscle-based, multi-layered facial expressions and lip sync, plus how to build realistic human skeletons with *Max Bones*, and you're also introduced to utilising third-party software like *Physique* and *Biped* from Cstudio.

With subtle information on what makes a successful animation, this is one of the best *3ds max* tutorials on the market.

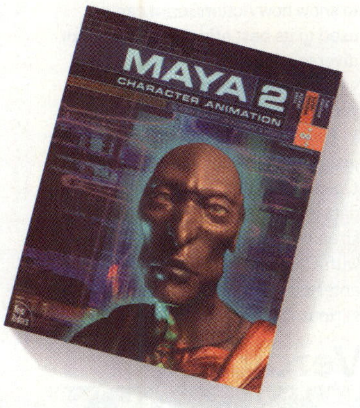
Verdict

★★★★☆

Maya and more

Maya 2 Character Animation

Price	£46.18
Authors	Nathan Vogel, Sherri Sheriden & Tim Coleman
Publisher	New Riders
ISBN	0735708665



The art of character animation is not just mastering each feature of your chosen animation package, but having a deeper understanding of what makes one animation successful while another fails to engage. *Maya* is hardly mentioned for the first third of the manual, instead, the author chooses to compile a character profile, then he deals with storyboarding and finally goes into character design itself.

Maya 2 can be used for any kind of 3D animation, but this manual concentrates solely on the features that you need to master to create believable characters. You'll learn how to handle texture mapping, and later chapters cover how to light your characters to best effect, and how to master the all-important facial expressions.

This is perhaps the best manual available on *Maya 2*. You'll see how to handle each of the package's features, as well as how to breathe new life into each of your character animations. ➤

Verdict

★★★★☆

Flash inspiration

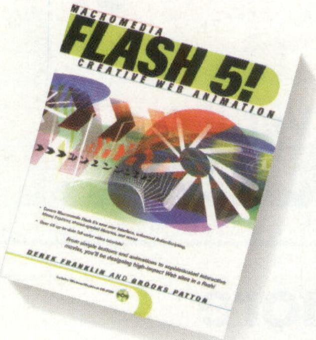
Flash 5! Creative Web Animation

Price
£29.99

Authors
Derek Franklin &
Brooks Patton

Publisher
Peachpit Press

ISBN
020171969X



This manual looks closely at the essential elements that constitute a *Flash* animation, such as how to handle layers, sound, text and graphic elements. More advanced features with ActionScript are also touched on. If you are new to *Flash*, you'll learn how the *Flash* environment and its tools operate, and absorb some inspirational ideas. If you like your manuals dense with text and very few illustrations then you will be at home, although beginners may find this approach a little overwhelming. More visual help with graphics and screenshots would have made things easier to follow.

With a CD that enables you to watch techniques for over 40 of the tutorials as *QuickTime* movies, this is an excellent resource.

Verdict

★★★☆☆

Technical skills

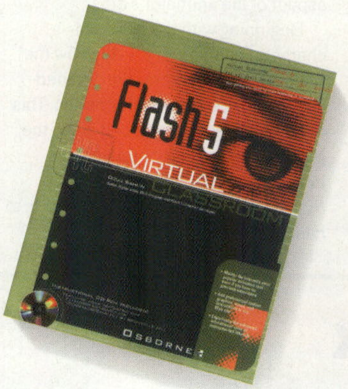
Flash 5 Virtual Classroom

Price
£29.99

Author
Doug Sahlin

Publisher
Osborne McGraw-Hill

ISBN
0072131152



The easiest way to teach technical skills is to show your audience how to achieve the result they are striving for, which is precisely what this new series of books aims to do.

Step-by-step instructions cover all of the basic techniques, beginning with how to create graphic objects and concluding with how to publish your *Flash* animation. But it's the CD that makes this book stand out.

Similar to the visual teaching aids included in the *HOT* guides from Lynda Weinman, this book offers a CD that uses *Real Player* to present a virtual teaching environment complete with personal tutor. This type of one-to-one teaching is the shape of things to come. *Flash* beginners need look no further for their first *Flash 5* manual.

Verdict

★★★★★

Hands-on projects

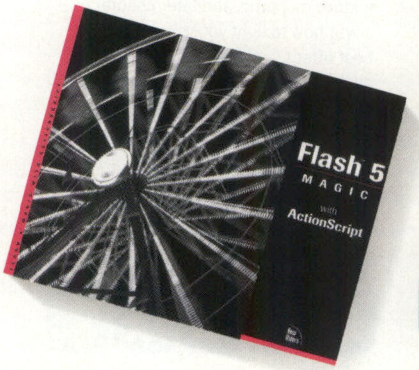
Flash 5 Magic with ActionScript

Price
£34.99

Authors
J Scott Hamlin &
David J Emberton

Publisher
New Riders

ISBN
0735710236



The authors describe ActionScript as: "...intelligent glue, allowing you to combine various elements of a project programmatically, and to create movies that go far beyond simple linear animation."

This book uses hands-on projects to show how ActionScript can be used to its best effect in a number of diverse environments, from online games to integrating a database into your Website.

High bandwidth may not be with us just yet, but the book shows how *QuickTime*, Smartclips, parsing XML data and working with external data streams can be used in conjunction with *Flash* and ActionScript in an entertainment site. Recommended for serious *Flash* designers.

Verdict

★★★★☆

Learning curve

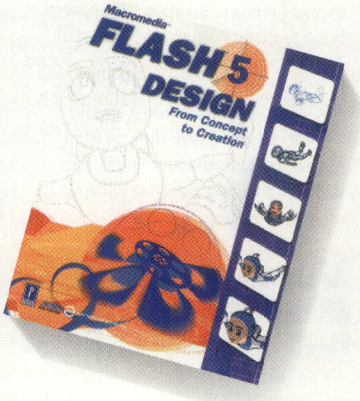
Flash 5 Design From Concept to Creation

Price
£43.99

Author
Jamsa Media Group

Publisher
Prima Tech

ISBN
0761527524



Written by a team of experts, the aim of this manual is to provide a gentle learning curve that enables you to handle all of the basic *Flash* features and techniques.

Sample Websites provide practical solutions to design problems, all of which utilise the most powerful features of the *Flash* environment. A good example is chapter 20 which looks closely at how to develop a multimedia order form if you are working on an e-commerce Website.

This manual does have a lot to offer the *Flash* user, most notably the Website URLs for excellent tutorials and the overview of third-party plug-ins, but the majority of the information could have been made more detailed, and offered at a much better price.

Verdict

★★★☆☆

Animation in the real world

The Art of 3D Computer Animation and Imaging

Price	£42.95
Author	Isaac Victor Kerlow
Publisher	John Wiley and Sons
ISBN	047136004X

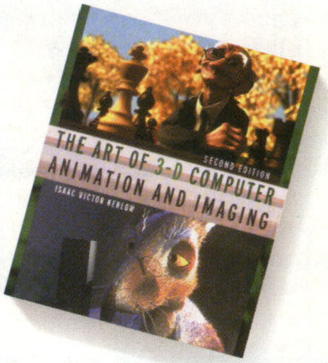
This lavishly illustrated book which contains over 500 full-colour images not only teaches the art of 3D computer animation but also traces the development of this art form from its beginnings to today's CGI spectaculars. Now in its second edition, this book has been completely revised and updated to include the latest developments in character and facial animation techniques, plus information on the latest motion capture developments.

Kerlow has updated his 1996 edition, this time taking onboard more on digital production techniques, more important in recent years, as well as covering the usual animation elements such as dialogue, movement and expression.

We first take a look at how the digital animation process is planned, and later chapters move through the modelling and rendering stages. Section four covers animation from storyboarding to character development, with section five covering post-production and the output of completed film.

Using animation classics such as Pixar's *Geri's Game* grounds this book within contemporary animation. Kerlow describes what makes good design, and uses practical examples to implement this knowledge. Using existing animations that you may already know makes this book more compelling than the traditional software manual.

Practical advice is here in abundance, but relates to real-world examples such as the lighting techniques in the Columbia Picture logo. Ultimately, you'll wonder how you ever did without it.



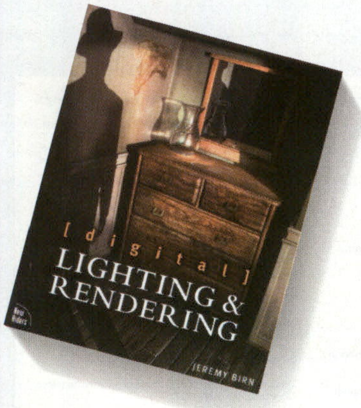
Verdict

★★★★⯪

Environmental issues

Digital Lighting and Rendering

Price	£38.99
Author	Jeremy Birn
Publisher	New Riders
ISBN	1562059548



The art of animation isn't simply the construction of a believable character. More often than not the environment they inhabit governs how realistic they become. This book, which takes its cue from the art of film cinematography, takes a close look at the fine art of lighting a scene and the author provides you with the tools you need to build that all-important lighting element into your designs.

You'll learn how to build a workflow that culminates in an appropriately-lit completed scene. The essential techniques of lighting set-up, colour and composition are all considered and today's lighting techniques such as photon mapping and raytracing are discussed in-depth. No matter which animation package you favour, you can apply these techniques with ease and your scenes should take a quantum leap in their perceived reality.

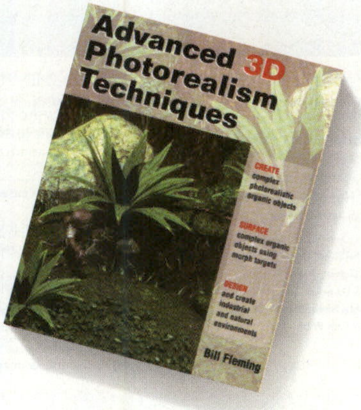
Verdict

★★★★☆

Setting the scene

Advanced 3D Photorealism Techniques

Price	£32.50
Author	Bill Fleming
Publisher	John Wiley
ISBN	0471344036


Advanced 3D Photorealism Techniques
CREATE complex photorealistic organic objects
SURFACE complex organic objects using morph targets
DESIGN and create industrial and natural environments
Bill Fleming

Character animation doesn't exist in isolation. To be believable, it has to exist within a realistic scene. This means mastering the art of creating photo-realistic backgrounds. This book will provide you with all the tools and techniques you will need to do just that.

Following on from Fleming's earlier books, this one, as the title suggests, looks at the art of photo-realistic design. Each of the six chapters begins with a discussion of the technique in hand before moving onto excellently described tutorials. Exterior scenes are also covered – a major bonus.

This manual is also more software specific than earlier books which should enable you to adapt each technique to your software package. More colour illustrations would have been useful, but as it stands, this is the must-have companion to Fleming's *3D Photorealism Toolkit.* ca·s

Verdict

★★★★☆

Anthony Robinson

Catherine McIntyre

Jacey

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Next month [20/05.01]

All contents correct at time of going to press

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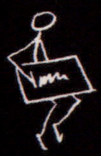

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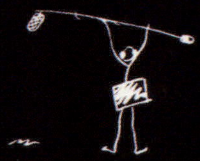

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